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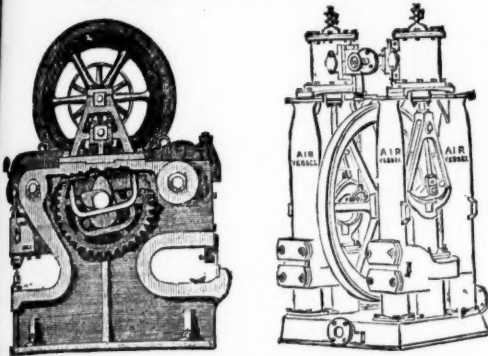
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No. 2180.—VOL. XLVII.

LONDON, SATURDAY, JUNE 2, 1877.

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28-30, 27-10, 28-40, 28-70 metres. Total advance of south head-
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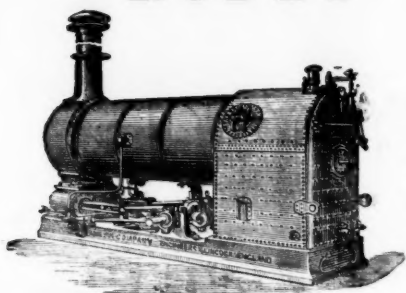
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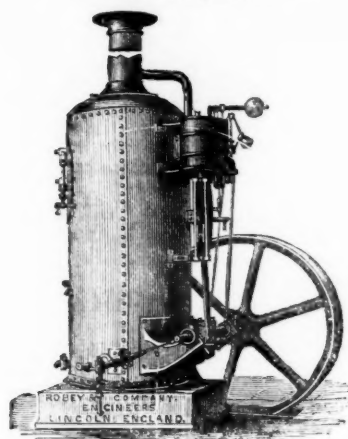
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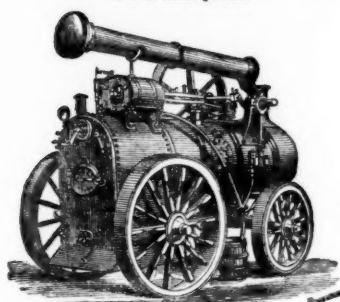
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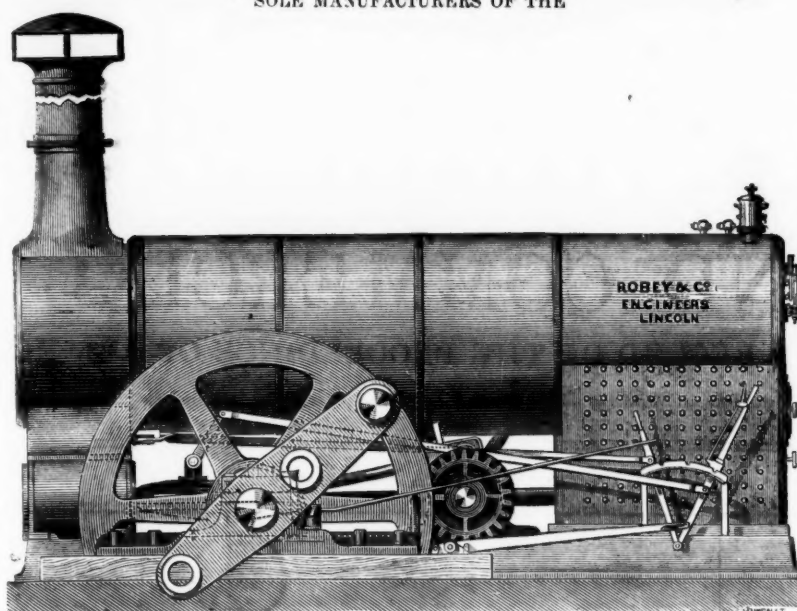
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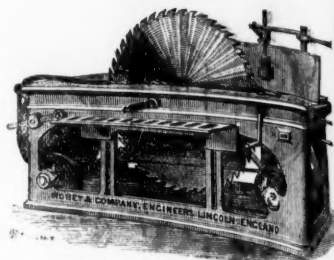
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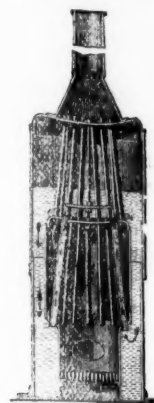
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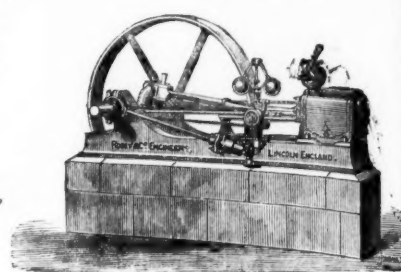
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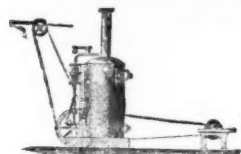


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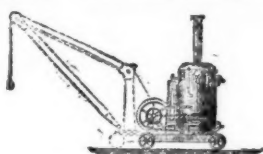


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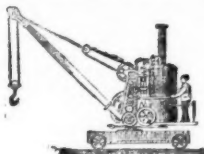
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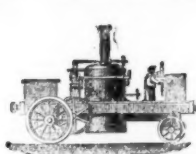
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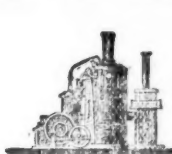
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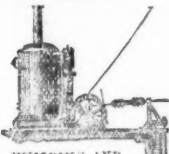
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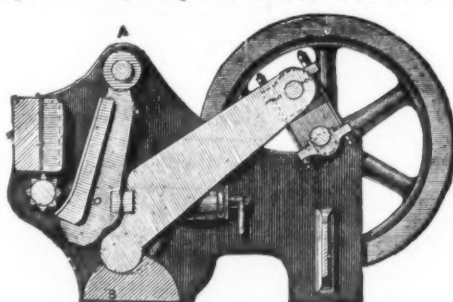
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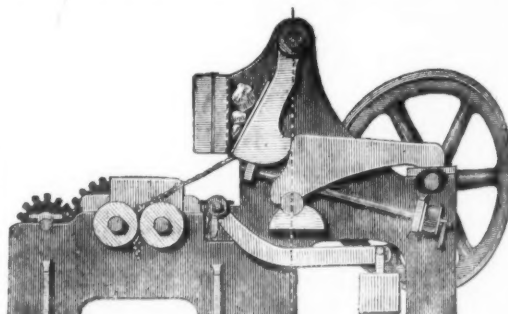
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JUNE 2 1877.]

Original Correspondence.

ATMOSPHERICAL INFLUENCE IN CONNECTION WITH COLLIERY EXPLOSIONS.

In the Journal of May 12 some remarks appeared in reference to a valuable paper on this subject which had been read by Mr. Warburton at the Midland Institute of Mining Engineers. In last week's Journal a letter from Mr. Warburton, in reference thereto, was published; and we have since received from a correspondent a full abstract of a supplemental paper by Mr. Warburton, submitted to the same institution, and which we have much pleasure in placing before our readers.

As I stated at the conclusion of my paper that if what I had advanced were deemed worthy of discussion I should have pleasure in taking part therein, and trying to elucidate what I had said, in so far as it may seem to differ from the received notions of the question under consideration.

The subject matter of my paper consists of three considerations, in order as follows:—

1.—The barometer, as an instrument for indicating the changing conditions of the atmosphere, and its use or value as a forerunner of approaching liability to explosions in coal mines.

2.—An analysis of a barogram and thermogram, by Messrs. Scott and Galloway, in which I attempt to show that their barogram and thermogram do not support the conclusions these gentlemen arrived at, and further that had their diagrams supported their conclusions, there would have been wanting the important element of connection; consequently the diagram could have been of use only as a curiosity of coincidences.

3.—The advancement of a hypothesis that the presence or absence of heat in the atmosphere taken into the mines influences the exhalation of gas from the pores of the mine.

Regarding the first consideration I need say little more than appears in the paper, beyond repeating that in whatever degree the barometrical column may move before this movement is perceptible the gas will have made its movement to an equivalent of the distance of such movement; and that, instead of being an indicator of what is about to take place in the mine as regards the exhalation of gas, it is an indicator only of what has taken place before its movements are perceptible.

The second consideration in my paper needs very little elucidation. If it be gone through there will be no difficulty in perceiving that it lays bare an important omission in the consideration of barometrical changes in connection with colliery explosions. An omission of so much importance that the diagram under review is of no value at all from a scientific standpoint. And so far as I know all meteorological observations and colliery explosions put on record as cause and effect are simply collated incidences not a single instance to my knowledge exists in which correlation has been established. The incidences have been collated, and the existence of a relationship inferred and accepted. The conditions of collieries over the coal fields of Great Britain are so variable that it would be most difficult and unscientific to base any correlation between the state of the atmosphere and an explosion. Even at the same colliery the conditions vary so much that what was the state of things at eight o'clock cannot be calculated upon as being the same at nine o'clock of the same day without any change in the atmosphere. For instance, a "weight" may be coming on and in its motion press so heavily upon the face of the coal as to squeeze or press out the gas from the coal for 2 or 3 ft., or even more of the solid coal and practically fill the pit with gas, when two hours before it was quite clear and free. The condition of the barometer would be an infinitesimal amount compared with the enormous mass of moving rock of varying thickness up to 40, 50, or even 100 yards. May not many of the explosions that happen now with the falling roof be due to this instead of the common conclusion that the gas comes down with the roof? I think it is far more likely to be the case, that is, premises the roof to be free from any accumulation of gas. When conditions of this kind and others such as are incidental to all coal mining operations are taken into account in collating the meteorological changes with explosions then, and not till then, we shall be able to form some idea of their correlation.

The third consideration of my paper, from the fact of its being, so to speak, new, offers scope for a little speculation, but if I am able to call to your minds facts, and connect these with scientific demonstration, there will, I think, be a case made out worthy of your consideration. I may state at once that I have arrived at my conclusion in this hypothesis upon the basis that "heat is power." For the better understanding of this hypothesis it will be well to take into account matter as existing atomically, and also to take into account the fact that the constituents of the atmosphere are a fixed quantity under ordinary circumstances, and the proverbial variability of our English atmosphere is not a change in the constitution of the atmosphere, but simply a change of conditions. That is, the total variability is one of condition. For my purpose, at present I will leave out the question of the energy due to the increased temperature of the air, as I am not clear as to whether it plays a part other than that of radiation. I will, therefore, go to that at once.

The question of absorption and radiation forms in itself sufficient for a paper. As, however, I introduced it as a most important element in connection with my paper, I must needs follow it up a little. As is known to most of us, the atmosphere consists of oxygen and nitrogen, with a small percentage of other gas, forming not more than some 1 per cent. of the whole—that is, the two elements named make up about 99 per cent. of the whole. Amongst the 1 per cent. remaining, but not the whole of it, is aqueous vapour, consisting of two atoms of hydrogen united to one of oxygen. This portion of the atmosphere may be said to be more of a condition in which the atmosphere is than an integral part of it. It is this aqueous vapour medium, so to speak, that plays the important part of absorption and radiation in the atmosphere. When the atmosphere is at a low temperature the aqueous vapour occupies a smaller space, so to speak, and the atoms of oxygen and nitrogen are closer together, but when heat from the sun or other sources comes in contact with the atmosphere in low temperature, the aqueous vapour seizes or appropriates the heat with avidity, and thrusts the atoms of oxygen and nitrogen further apart, and continues this absorption till it arrives at the temperature of the heat it has come in contact with.

The atoms of oxygen and nitrogen in their turn, by the motion given to them and their swinging about in the aqueous vapour, arrive at the same temperature. Now, this is precisely what takes place when air of a low temperature is taken into the pits. The aqueous vapour seizes with avidity the gas in the coal and goafs, until in a very short time the mixture may be at an explosive point. Bearing out this idea, why has it become a practice and an absolute fact of law that you shall send a man called the "fireman" round the pits each morning before the men go to work to examine and look for gas? Is it not because we have learnt from too painful experience that gas accumulates during the night? And why should gas accumulate during the night? There are not the men and lights to ventilate for. The air causes intake and return air less interrupted, and there is no opening of doors and lifting of sheets. When the ventilating power is kept up as it is professed to be the pits should be clearer of gas during the night and in the morning than during the day, when men are at work with their lights, and the interruptions to air by the opening of doors and sheets, and the check given to ventilation by the ascending and descending cages in the shafts.

Taking the matter broadly, the pits should be clearer in a morning when no work has been going on, but they are not so, and on what true grounds can we account for this other than that it is due to the low temperature of the air we take into the pit during the night as compared with the day. The men's lamps and movement of tools all being absent the aqueous vapour can receive its requirement, so to speak, only from the coal and strata of the mine, and consequently absorbs more heat probably in the form of gas than it would if all were at work. Towards bringing up this gas to an explosive point there is another important contributing element in an atmosphere of low temperature—when the temperature

is low the aqueous vapour occupies a much less space, and the atoms of oxygen are so much nearer together, so that space for space under these conditions a less amount of gas will bring the mixture up to an explosive point. Hence we have in the winter seasons a keener quicker gas; and, as is known to all experienced men, a top on the flame that will fire before it is half the length it will show in warmer seasons.

Not alone is the low state the air in its absorptive power, but in conjunction with it is the energy of the intensity due to the superior heat of the gaseous matter of the coal to fall, so to speak, to the level of the air passing. As a good illustration of this, instance the condensing-engine; the power of an engine of this kind does not alone depend upon the pressure of the steam, but conjointly with the temperature of the condenser. Who that knows anything of the working of such an engine has not heard of the jack well being hot, and the engine would not work. The cause of this is simply that the two temperatures are in a state of equilibrium, or so nearly that the superior could not move the machinery it has to pass through in falling to the inferior. But cool the jack well and the condenser, and with the steam at the same pressure it was your engine will work, and the colder you get and keep them the more effective force do you get out of the engine, though the steam be at the same. So it is when the coal and the gaseous matter in it are at a temperature higher than the air that is passing. The greater the difference, the more rapid and copious will be the fall, and will diminish as the distance becomes less, till a state of equilibrium is reached, and then that motion like the condensing-engine ceases, provided no other conditions interfere.

Let us now take the air into the mine at a higher temperature, at (say) 70° from the surface, and for convenience of argument will assume it remains at that temperature till it comes in contact with the coal. As we said earlier on, the constituents of the atmosphere are constant, the variation depending solely upon condition. Our air at present being 70° has had a force put into it by the lifting up, so to speak, of its temperature from 34° to its present height. And of this amount of heat the aqueous vapour will have absorbed 80 times more than the whole of the atmosphere besides. So that this vapour is much further removed from the point of saturation, and so far gone in the direction of steam: hence it is endowed with a force by every excrement of heat that expands itself, and bursts itself wider and occupies more space, separating or thrusting asunder the atoms of oxygen and nitrogen. In this condition it comes in contact with the face of coal, and exerts just the same force upon the coal roof or goaf; but as these are of the temperature neither passes into the other; they are in a state of equilibrium, and except other conditions enter no gas can escape; hence we have what I have called a "prohibitive ability."

And if you lift the height of the air above that of the coal the former will fall into the coal till a state of equilibrium is found. This I will call positive prohibitive ability, by way of distinction from another element that contributes to the lessening of liability to explosions. Continuing with our air at 70°, as previously stated, the atoms of oxygen are thrust apart, consequently space for space there are far fewer atoms of oxygen; or, in other words, we might say there is not so much oxygen in the air—that is, in the air space for space. So that if our gas comes off at all—which it will by pressure acting on the coal and by cutting and getting it down—it requires a considerably larger quantity of gas to bring it up to the explosive point owing to the less amount of oxygen in the air—always keeping in mind space for space. This is what I have called negative prohibitive ability. Who that has had experience in gas but what has seen this and may see it regularly. In this latter case you have a long brown top, with little disposition to explode, I may carry my case further. If what I state is true an explosion in winter, taking space for space, will be far intenser than a similar one in summer. This is also borne out by fact.

THE MINING INDUSTRY OF CHILE—No. II.

SIR,—In my last I referred to the great fortune acquired by Mr. Charles Lambert in the copper mines of the province of Cuzimbo, which was stated in the Illustrated London News to have reached the large sum of 1,600,000. This particular case happened to be brought before the English public accidentally, through his long residence in England. We have a great many large fortunes in Chile made by native mineowners, which have not been heard of by the general public in this country. From the silver and copper mines in the North of Chile we have about \$150,000,000 in dividends distributed amongst the greater part of the rich people of the capital of Chile—Santiago, which may be said to be a city of palaces. After an absence of over 20 years from that country I was certainly astonished to see the great quantity of magnificent houses, most costly edifices, which one could hardly conceive to exist in a small country like Chile. Mr. Rumbold, the English Minister to Chile, in his recent work on that country, says—"The wealth of the mines of the province of Atacama, in Chile, is remarkable, and it will suffice to say that in 30 years, from 1843 to 1873, the production had reached the enormous sum of \$200,000,000, or an annual yield of 1,320,000." He continues, saying "that these rich mining districts extend over five degrees—from the 29th parallel to that of the 24th. Its richest mines are to be found over districts covering 100 leagues, or 300 miles. Much of this vast region is still imperfectly known, though partially explored by Dr. Philippi some 20 years ago, by order of the Chilean Government. Every conceivable mineral product is found there; silver in abundance, copper, gold, nickel, and cobalt; not to mention the great pampas (or plains) covered with nitrate of soda." The latter are the nitrate beds which have recently been taken up by Chilean bankers and merchants, and reported upon by a Chilean Government mining engineer.

I will here give you an illustration of one of the very great many rich copper mines of Chile, worked by native owners, and its production during nine years, from 1866 to 1875, taken from the printed statistics of the Government. I simply copy the table of production. This is one of the mines, but by no means the richest, in the great district of Tamaya.

DISTRICT OF TAMAYA, COQUIMBO.—Ores produced by the Rosario Mine, from Jan. 1, 1866, to June 30, 1875:—

Year.	Quantity—tons.	Average percentage.	Value of the copper.
1866 ...	6,700 ...	29 ...	\$634,731
1867 ...	4,000 ...	27 ...	354,186
1868 ...	6,200 ...	20 ...	366,572
1869 ...	7,000 ...	17 ...	338,133
1870 ...	5,000 ...	19 ...	286,755
1871 ...	4,500 ...	16 ...	232,618
1872 ...	5,800 ...	18 ...	423,645
1873 ...	9,600 ...	18 ...	691,299
1874 ...	11,000 ...	17 ...	725,002
1875 ...	5,000 ...	18 ...	340,183

The average per cent. for the nine years was 19, the quantity of tons 64,000, and the value of the copper \$4,393,128, or, in round numbers, \$50,000. When I was on this mine in August, 1876, the production for that month was 940 tons, average assay for the month 21 per cent. Mr. Urmeneta's mine, belonging to the rich and well known Chilean copper smelter, close to this mine, and on the same vein, has produced thrice the above amount—180,000 tons, of an average of 30 per cent., during fifteen years. I could give you a great many more such, but I should only tire your readers with the monotonous rich copper mines of Chile. The great feature is that all this immense production of copper is not due to Limited Liability Companies, but to the fact that Chile possesses the richest mines, and the greatest facilities for such, and that Chileans are the most expert miners on the American continent; they are plucky, and never afraid to continue working their mines even if they have to give out their last dollar. They do not grumble, or accuse their directors, promoters, &c., of fraud, &c. They know that mining at times requires sacrifices to be made, and that in the long run by faith, intelligence, and perseverance they are sure to succeed. This is also a great feature of the general success of mining industry in Chile.

After a practical experience of 28 years in mining in many countries, and 10 in Chile, I come to the conclusion that few countries offer the cheap, safe, and sound mining investments that Chile does. The natives work their mines with their own resources, and care

little for English capital, as their mines do not require any, and produce more copper than all the rest of the world, the English estimate being 60 per cent. of all that is produced.

HENRY SEWELL, M.E., F.R.G.S.

10, Upper Westbourne-terrace, London, May 29.

THE RICHMOND COMPANY v. CHILIAN MINING.

SIR,—In the Supplement to the Journal of Feb. 17 (page 185), "Common Sense," referring to the explanation of the 100,000 loan by the Chairman of the Richmond Company, that they were not in debt because they held bullion, stores, and ores on hand, says the answer was wonderfully clever and original, and that it was a discovery approaching the philosopher's stone; and "Common Sense" commends it to the notice of Peru and Chili and other States of that order. Comparisons are odious; but this only shows his want of knowledge of those countries. He had better study his geography, and ask his stockbroker about Chilean stock; he evidently does not know that Chile exports large amounts of silver, and the greater part of the copper that is produced every year in the world. That Chile pays regularly the interest on its debt, and can easily raise money within itself. The Government having just stated it required \$2,000,000, the sum of \$1,600,000 has been offered before the issue of the loan. Valparaiso, which is the principal port of Chile (not Peru), has just subscribed \$300,000 for additional waterworks and a municipal loan of the same amount. The value of the yearly exports of minerals is \$16,000,000 to \$17,000,000, the greater part copper. You will judge how far English capital assists us to produce the \$16,000,000 yearly.

Name of English company.	Nominal capital.
Panulcillo ...	£200,000
San Pedro ...	50,000
Copiapo ...	200,000
Condes of Chili ...	80,000

Four English companies representing ... £530,000

This is all that English capital contributes to our yearly export.

The Panulcillo Company produced 14,000 for last half-year's profit. They have a wonderful mine—a lode of 50 to 70 ft. wide, of ore averaging something over 5 per cent. The profit is owing to the present management; the company could have done as well previously. The reasons are known in this country. All the company now requires is a fair price for its copper.

The San Pedro Company was formerly rich in the carbonates, and is passing through the poor ground usually met with before reaching the sulphurets, so it has very favourable prospects.

The Copiapo Company has had fine opportunities, being the oldest company, but has not taken advantage of them. It does not publish any monthly reports: it seems to require energy, new blood infused into it, and to call up some of the uncalculated capital. Mr. Sampson Waters (the late) made a large fortune in copper mining after managing the company.

The Condes of Chili Company, purchased last year for 70,000, has already shown itself superior to the reports on which it was purchased, and is shipping from 300 to 400 tons monthly of silver-lead ores, of 40 per cent. lead, and 100 ozs. of silver from the Isolina Mine alone. The other six adjoining lodes are being prospected with every appearance of success. The management and working are energetic, and should be supported by a larger working capital than 10,000, for seven mines. Although 700 mules are employed in the freight, the ores accumulate on the floors.

Lastly, we have no law suits or questions as to our title deeds or patents, like the Richmond, Flagstaff, Tecoma, and the celebrated Emma Mine. Many Englishmen have come out to Chili without capital, and have made fortunes both in commerce and mining; amongst the latter Mr. Charles Lambert, the owner of the Brindador Copper Mine, who retired as a millionaire to England. Still, there is ample room for the safe investment of English capital in Chili.

In many mines the ores are still brought out on men's backs in hide bags, no windlass or whim being used. Many will pay by placing concentrating machinery, engines, or smelting works, and scientific mining. The climate, mineral wealth, and mountain ranges, as well as the geology, make it a duplicate of California, and there are numerous old gold mines and gold washings as rich as in California which are worked only with the pan as in the time of the Indians and Spaniards. For these we require capital to erect proper stamping or crushing machinery, and to adopt the hydraulic system. Because Chili has progressed in an orderly and quiet manner, and has not blown its own trumpet, it is classed, by people who are ignorant of geography and many other matters, together with the rest of the other South American Republics.

Valparaiso, Chili, April 14. JOHN SEWELL, Mining Engineer.

CHILE, AND ITS COMMERCIAL CREDIT.

SIR,—The enclosed slip from the Chilean Times serves to confirm what we wrote you a few days since of the facility with which the Chilean Government can obtain loans from its own local capitalists, and the confidence which it inspires.

Valparaiso, April 20. JOHN SEWELL, Mining Engineer.

"On Saturday a decree was issued calling for subscriptions, up till 5 P.M. of the 21st inst., to a loan to produce two millions of dollars net. Although so few days have elapsed since the publication of the above decree, the loan has been already subscribed—a fact which speaks more eloquently than words for the credit of this country, and which cannot but be highly reassuring to foreign holders of the national bonds. Valparaiso alone, in one day, subscribed for no less a sum than 1,637,000, as follows:—A. Edwards and Co., \$450,000; Banco Nacional, \$450,000; Banco Valparaiso, \$115,000; Banco Consolidado, \$115,000; Federico Varela, \$115,000; John Brown, \$170,000; A. M. Macquenn, 100,000; David Thomas, \$85,000; Ca. Nacional de Seguros, \$25,000; R. Robert, 12,000; total, \$1,637,000 nominal. This, following within a week the \$300,000 loan to the municipality, for supplying the city with water, proves not only that the authorities, general and municipal, enjoy the highest confidence of the people, but also, which is not less satisfactory, that in spite of the crisis there is a little capital left in Valparaiso yet. There is no doubt that the subscriptions to the loan will be largely in excess of the sum required.—April 14.

PARYS MOUNTAIN COPPER MINE.

SIR,—Amongst the neglected securities in mining shares I would call attention to the above property. The mine, with all its reserves of ore, machinery, plant, and rich bluestone quarry, together with immediate prospects of a heavy strike of rich copper ore in the 90 cross-cut, under quarry, is far below its present value, or anything approaching it. The remedy for this is for shareholders not to sell, for if there are no sellers of these shares prices must improve. Within the last week I observe a greater number of transactions are reported in the mine during the past fortnight. I presume that buyers of the shares are well aware that the 90 cross-cut is supposed to be on the point of breaking into a body of ore, which it is believed is practically unlimited, and, in fact, solid, as once proved in this mine over a hundred years since, and which indications of no ordinary kind tend to prove will be repeated almost directly.

OBSERVER.

PARYS MOUNTAIN COPPER MINE.

SIR,—Being greatly interested in mining properties in this locality, I write to ask for further information concerning this mine. I read with increased interest some correspondence in your valuable Journal on these mines, and should be glad to know if the stream referred to so full of rich copper deposits is really being followed up by the 90 cross-cut at the quarry. This seems to me to be a very important point of consideration. From where else can this dark claret-coloured mineral stream gather its thick deposits but from masses of ore at hand. To interested shareholders I may add that I know of no more charming locality than North Wales for a ramble amongst wild scenery of vast mountains and rushing streams, and for a holiday trip commend me to a visit to the glorious and mighty Parys Mountain Mine, there to see the prospects of wealth about to be hewn out of the rocks, so wild and rugged, and, as I believe, about to become a second Burra Burra of Wales. It, therefore, seems a great pity that shares in this property should have been permitted to fall so unduly when the remedy is at hand to keep them until the early success of the mine is established. With the coming improvements and judicious management in the next quarter, I am convinced that the mine will pay all expenses and the great anticipated strike in the 90 cross-cut is made. The great desideratum in a mine like Parys Mountain is, of course, the employment of as many

tributors as possible, which no doubt will be taken advantage of as much as possible at this important turn in the prospects and history of one of the finest copper mines in the British Isles.
Flintshire, May 29. AN ENGINEER.

NEWTON SAINT CYRES, DEVONSHIRE.

SIR.—Last week I made some remarks on our valuable Manganese Mine. This splendid lode crops out for many miles in length, but its grandest deposit was found about two miles further east—at Upton Pyne, where the ore was so abundant that it was carted away from the open pit. The next best deposit was found near the spot where Mr. Sims is now working. Here, instead of gossan or capel, the rich silvery crystallised ore came to the very surface, and was spread over the field like lava from a burning mountain. It is not generally known that manganese is one of Nature's best gifts, because it is an indispensable ingredient in the manufacture of steel, and much prized for its admirable bleaching properties.

On Tuesday I paid Frank Mills a brief visit. Three years ago the mine looked dull, but now by the perseverance of the purser, and the judicious advice of Capt. Southey, the aspect of everything is completely changed. In fact, the halcyon alone by the aid of Capt. Southey's automatic machinery might be made to pay a dividend.

On my journey by train to this mine I passed through Bovey Tracey, where there is an extraordinary coal mine of vast extent. Surely this might be economically worked, and sold to the poor. The mineral is so abundant that it would be raised for half-a-crown a ton, and it should be a great boon in a cold winter. I believe that Mr. Pengelly, our eminent geologist, and the late Capt. Ennor have both inspected it.

One word in conclusion respecting the quicksilver which was lately discovered near Exeter. Is it a component of the rock, or was it accidentally thrown into the river? I hope that someone will be found to settle this question *pro bono publico*.

May 30.

E. T. MAY,
Vicar of Newton Saint Cyres, Devonshire.

LANNER VALLEY.

SIR.—In the Supplement to last week's Journal I observed a letter relative to a rather untoward circumstance which occurred half a century ago at Penstruthal account-house, a circumstance with which I am thoroughly conversant, and which I remember in detail as though it had but on yesterday taken place. From the writer's apparent knowledge of the case, he must know also that the parties connected with this little not altogether singular mishap, were men of high respectability, and that they were most respectably connected, and that the "girl" therein concerned—pretty, and the very picture and essence of neatness as she was—was, notwithstanding her then position, not less so; consequently the whole neighbourhood instead of, like your correspondent chuckling over the event, manifested a feeling of deep sympathy. The poor unfortunate creature quietly left the neighbourhood and her family and friends, I believe, never to return. But that she contemplated suicide I do not remember that ever I before heard. Why rake up this after the lapse of 50 years? What purpose can it effect, what benefit can possibly result therefrom to anyone, and what was the motive in so doing, other than that of endeavouring to traduce the memory of the dead and to wound the feelings of the living? What consolation can it afford the surviving relatives—of which there are many, and known to me—to be told, through the medium of a public journal, of the foibles, weaknesses, and petty misdeeds of their friends years after they have been mouldering in the dust? The writer, in referring to the late Capt. William Martin, also says that in addition to other weaknesses of which the captain was the subject he was a "tippler." Is it, I beg to ask, any gratification, comfort, or consolation to Capt. Martin's numerous surviving children to be told through the medium of the public press, and that many years after their father has passed from them, that he was a sottish drunkard. If there be men sufficiently malicious and wicked thus to write, surely such persons must be blest with an abundance of leisure, and consequently experiences what Doctor Watts expresses in his divine songs "The Devil finds some mischief still for idle hands to do."

London, May 30.

JOHN LEAN.

MUTATIONS IN MINING.

SIR.—The changes which are in continual progress in mundane affairs cannot be more striking in any department than that of mining; not only in the mines themselves but in those who conduct them. A brief retrospect will show this. Take 20 years last past and we see that the men of 1857, who were then in the zenith of their power, are now either in the dust or gone down into comparative obscurity. There was Capt. J. Lyle, the manager of Carn Brea and many other mines, gone off the stage, and the 45,000*l.* savings of his life, have been wasted by his devisees. Mr. F. Pryor, late of Redruth, was the manager and purser of nearly 20 mines at one time; he also is gone to his rest in the grave. He was at one time possessed of 60,000*l.* (so I have been informed), but he died poor, at the time of his death having only one mine in his power. Capt. T. Richards, of Redruth, said to be a man of considerable ability, had 15 or 16 mines under his control at one time; now not one, but he is still alive. His father, Capt. William Richards, a popular mine manager in extensive practice, died a few years ago, but most of the money he earned in some mines was spent in others, so that he did not die a rich man. Then there is Capt. Teague, of Tinroft, in a short time lifted from the platform of a poor miner to that of mine proprietor, manager, and landowner, and that was done, not by any illegitimate modes—such as the charging large premiums for seats—but by the fairest possible proceedings, showing a skill of unusual superiority in finance, &c. As to the mines, five out of six at work 20 years ago are now idle, and most of those now at work are in a trembling state—almost ready to succumb to the depreciated price of tin. In time few things are fixed; in eternity there is fixity.—May 30. R. S.

WEST CHIVERTON MINE.

SIR.—Mr. Granville Sharp admits that at the last meeting the cost was charged only up to February 24, while the sales of mineral were brought up to May 2. Now, this leaves considerably more than two months' cost totally unprovided for on the day of the meeting—a matter of something like 8,000*l.* Then with another smelting firm failure, if, as is rumoured, West Chiverton again makes a loss of 16,500*l.*, we have a grand total of very nearly 7,000*l.*, which should be provided for at the next meeting in addition to the regular four months' cost. What a position for a mine where they are trying to make believe they are earning 8,000*l.* a year! Mr. Granville Sharp's remark that this has been the case ever since he has been the secretary does not improve his position, for he entered into his present office with the promise of improving matters, and should have done so before pocketing the 5,000*l.* presented to him by the company. I am exceedingly obliged by Mr. Granville Sharp's offer of giving me a lesson on mining accounts, but having learnt something of mining and of mining accounts probably before Mr. Granville Sharp ever saw a mine, it is scarcely worth my while to become his pupil now.

I did not mix up these matters with Pedn-an-drea. Why did Mr. Granville Sharp do so? I am perfectly satisfied with Pedn-an-drea, and Mr. Granville Sharp may just feel as he likes about it. I did not in my last letter, neither do I intend to in this, discuss the position of any other mine but West Chiverton, where I am sorry to find the position is not so good as I should wish, but it is due to the public that that position should be fully explained. Mr. Granville Sharp states that West Chiverton is "a mine that can take care of itself." If so, what credit can be due to Mr. Granville Sharp for the mine going right? None whatever. Then what did he get his testimonial for? Seeing that he has not protected the company against making bad debts, should he not restore that 5,000*l.* or so? Now, I would not advise Mr. Granville Sharp to mix up this with other matters, and then to say I had done so, for he may find that I shall give him enough to do if he only goes into each mine separately, but I will say nothing about his other little ventures before giving him an opportunity of demolishing, if he can, my position with re-

gard to West Chiverton. Another question with regard to West Chiverton. Have not the monthly quantities of lead sold fallen off, while the sales of blende have increased? If so, it would be satisfactory to the public that the cause of this should be fully explained? Redruth, May 31. W. TREGAY.

CAPTAIN TREGAY, AND PEDN-AN-DREA MINE.

SIR.—How very unfortunate Capt. Tregay is in his apologists, and in the names which they assume. In last week's Journal we have another who signs himself rather vaguely and suspiciously "A Tourist," and dates from the "Hotel, Redruth." He appears to know too much, and evinces his interest too clearly, to be taken as an impartial advocate. But what does all he say amount to? He complains of accusations which he says are made against Capt. Tregay. Now, Sir, everybody knows the French proverb, *Qui s'accuse s'accuse*, and I at any rate have made no accusation against Capt. Tregay. Some time ago I observed a letter from him respecting this mine, which I considered required an explanation, and I put certain questions to him, founded on facts within my knowledge. Both he and his apologists have carefully evaded answering these questions, which it is generally considered has not tended to their credit.

I have not said that there was anything wrong in the manner in which the mine was sold or purchased. But what I ask is this—How is it that under Capt. Tregay's management for the late company, with a much higher price for tin, the shareholders lost 65,000*l.* out of their pockets, and the same manager can, almost immediately after he becomes the sole proprietor, make a good profit in working the mine for himself, even with considerably lower prices for the returns? The "Tourist" seems to be active and inquisitive into the circumstances, and he says (from what he must be told by someone) that the discoveries have been made since the property came into Capt. Tregay's hands. But this has not raised the price of tin, and as I pointed out in my last, the 40 tons 16 cwt. sold in March, this year, realised only 178*l.* 5*s.* 3*d.*, while the average monthly cost in the last year of the company was 1850*l.*, though Capt. Tregay had announced considerable reductions in the expenditure, and there was the cost of returning only 20 tons of tin. The "Tourist" may think it best to keep the matter "quiet," but I and others differ from him.—May 29. W. X.

HOLMBUSH MINING COMPANY.

SIR.—I think there are some points in the accounts of this company for the month of April which require explanation. I find that the profit shown in the trading account for the month of April is 638*l.* 12*s.* 7*d.*, but as this includes an amount of 172*l.* for "copper ore stocked," of which 100*l.* was stocked at the end of March, the profit shown for April is in fact 538*l.* 12*s.* 7*d.*. Now, it appears from the sinking fund account that in the month of April an additional sum of 653*l.* 5*s.* 7*d.* has been expended in working the mine, for the new work account, which stood at 875*l.* 15*s.* 4*d.* at the end of March, had increased to 1529*l.* 0*s.* 11*d.* at the end of April. Also, 710*l.* 10*s.* 7*d.* was expended during the month of April in guarantee payments, discounts, commissions, advertising, and stamps, although not a single fresh share was allotted, the number standing at 50,000, as it did at the end of March. Consequently, against a profit of 538*l.* 12*s.* 7*d.* there is an expenditure of 653*l.* 5*s.* 7*d.* and 710*l.* 10*s.* 7*d.*, together 1363*l.* 16*s.* 2*d.*, and thus there is in reality a deficiency of 825*l.* 3*s.* 7*d.* on the operations for the month of April. Yet the report accompanying the April account announces another dividend for April at the rate of 30 per cent., and this on 21,434*l.* 18*s.* 6*d.*, the amount stated to be paid up, will absorb 526*l.* 1*s.* 11*d.*. Where is this money to come from? Perhaps Dr. Emmens will elucidate these points. May 31. INVESTIGATOR.

GREAT WHEEL VOR, &c.

SIR.—So this old, celebrated, and once productive mine is abandoned at last. Well, no mine can be kept working for ever. The last working commenced in or about the year 1851, by a London company, formed by Messrs. Crease, sons of Capt. Crease, R.N., who was lessee of the minerals under the Duchy, until he parted with his interest to the Duke about 20 years ago, so that at present all the minerals (tin at least) under the Duchy manors are in hand. But Wheel Vor is not in Duchy land. The advice to re-work these mines was bad; they ought not to have been touched after their abandonment by the previous workers in 1845. After cretting all the tin sold from the old mines, and also from Wheel Metal, the company up to about the year 1860 lost about 250,000*l.* Since then Wheel Metal has given several dividends of profit, but, upon the whole period, I suppose that the loss has not been reduced, because for several years the balance has been adverse. The previous company was formed about the year 1810, by Capt. John Gundry, of Goldsithney, a speculator in several other mines, whose residence was at Goldsithney, near Marazion. The first steam stamping engine erected in Cornwall was, I think, that erected at Wheel Vor in 1815. It was brought from Neath Abbey, in Wales, and a mechanical engineer, called Peter Godfrey, was sent down by the manufacturers to erect it. It was called Wolf's stamps. Since then great improvements have been made in the machinery—one is, that of the prevention of injury by the backward motion, which used to break the cams in the axle. Since then another (36 in.) steam stamp was erected, and still stands on the mine. Capt. Gundry found the mine, after a short working, to be rich in tin, and but for losses in other adventures he would have participated in the profits which accrued from the working, which continued till 1845, when poverty induced the company to suspend operations. Gundry was made a bankrupt in 1819. The profits made during the working was 272,000*l.* I have in my journal of 1824 the particulars of the tin smelting for a month. I find in that month the yield was 11,000*l.*, and the returns were of similar amount for very many years. I think that black tin was at a low figure—about 3*s.* 6*d.* per ton, notwithstanding which the company were enabled to divide a profit of 3000*l.* or 4000*l.* per month.

About the year 1829 a tin-melting house was erected on the mine, and was used for some years for converting the "black" into "white" tin, thereby enabling the company to take the smelters' profits as well as the miners' profits. The mines were called at that time Wheel Vor United Mines, and consisted of Wheel Vor, Wheel Vrah, Carleen, Pollard Downs, Poltown, and Penhale; and after war is Wheel Sithney was added, all worked simultaneously. Pollard, although within the sett, was not worked by the Wheel Vor Company. The sett embraced about 1400 acres, the largest in the county, but the late company had only about one quarter of that area, the other portions being granted to other companies, or ungranted. The depth of Wheel Vor is about 310 fathoms. If the tin left in the bottom were within 50 fathoms of the surface it might pay for working, hard as it is, but for pumping the water 300 fms. it will never pay. Notwithstanding that, it may happen at some future time that representations of riches left by the late company will induce some people to invest their money, as the Messrs. Crease did in 1851. No greater mistake can be made than in the resumption of works in deep abandoned mines. Such mistakes as were made here, at Godolphin, Great Wheel Alfred, and East Crinnis, should always be held in memory by capitalists, who should be advised to apply their capital to work in virgin lands, or in mines only partially developed, such as I could point out, from my knowledge of the mineral districts of this county. A great deal has been said of the riches left at East Wheel Rose, as well as of the riches taken from it. I have no doubt that a great deal of lead is there under the old workings, but, looking at the cost of the plant necessary for draining the mine and re-opening it (for it is said that the levels have collapsed), I question the wisdom of a re-trial. My opinion is that the capital required for such a re-opening could be more usefully expended in other places. My advice to men of capital, if taken, would be to "let it alone." Of all the numerous mines around East Wheel Rose not one met the costs of the working, but then most of them were only slightly tried. East Wheel Rose seemed a peculiar deposit—it enriched several Truro gentlemen, and some others.—City of Truro, May 25. R. SYMONS.

P.S.—A provincial newspaper states that the first pumping-engine erected in Cornwall was at Wheel Vor, in the year 1710. The late

Mr. W. J. Henwood, F.G.S., F.R.S., &c., said it was erected in 1741, the same year which is recorded as the date of the commencement of the great adit, which unwaters a great portion of Gwennap parish, and which is sometimes called the "County Adit," probably because of its greater length than any other in the county. Its length, exclusive of the branches, is about 33 miles.—R. S.

WEST MARIA AND FORTESCUE-BORING MACHINE.

SIR.—About 12 months ago we were asked and advised by the manager to purchase a boring machine for cross-cutting to the Dore Consols and other lodes; but although the machine has been at work in the mine for more than four months, nothing has yet been done in cross-cutting, and it-operations have been confined to driving on what is known as the Capel Tor lode in an unproductive corner of the sett. May I ask the directors through the Journal why they do not carry out their first intentions for which the machine was purchased. It is well known by residents in the district that the sett is very extensive and valuable, but why the western and southern parts of the sett have been so long neglected, where the ground is so much more congenial for the production of ore, is a mystery to every one who understands anything about mining. May 31. A SHAREHOLDER.

SOUTH CONDURROW.

SIR.—Being a shareholder in this mine I have received a statement of accounts, report, and cheque for dividend. It must be gratifying to the shareholders to find such a satisfactory state of things, more particularly so as tin is at so low a price. I find by the statement of accounts that after paying 6*s.* per share (1896*l.* 15*s.*) they have a balance of 1890*l.* 2*s.* 9*d.* carried forward to next account. The mine also seems to be improving, consequently we may expect a much better dividend next time. The shareholders must feel well satisfied with the management of the mine, which, unlike a great many others, the costs and expenses are fully charged up to date. I cannot understand how it is that mines almost valueless have their shares run up, while a *bona fide* one like this is left to stand so low.—Belfast, May 26. AN IRISH SHAREHOLDER.

MINING DERIVATIVES.

SIR.—It is amusing to see how the names of productive mines are copied—with prefixes or affixes—as the names of new mines, or of old mines reworked. Thus we see that Doleth has given names to New Dole, West Dole, North Dole, &c. &c. There are North Roskar, South Roskar, and West Roskar; Croft, East Croft, North Croft, and South Croft; Wheel Buller, West Buller, East Buller, and North Buller; Wheel Frances, East Frances, South Frances, and West Frances; Wheel Bassett, East Bassett, West Bassett, North Bassett, and South Bassett; also Buller and Bassett United; Carn Brea, East Carn Brea, and South Carn Brea; North Pool and East Pool; Treavean, East Treavean, West Treavean, and South Treavean; Wheel Virgin, East Virgin, and West Virgin; Powsy Consols, West Powsy Consols, South Powsy Consols, &c.; Wheel Maria, West Maria, Devon Great Maria; Great Consols, New Consols, West Consols, &c.; Wheel Rose, West Wheel Rose, South Wheel Rose, New Wheel Rose, Rose Consols, Rose United, &c.; Wheel Vor, North Wheel Vor, West Wheel Vor, New Wheel Vor, Great North Vor, and many more instances. As some men are reluctant to acknowledge their poor relatives, but are ready to claim affinity to rich ones, so people setting to work a mine desire to associate with it the name of a rich mine to give respectability to its character. You may ask, "What's in a name?" There may be some use to the promoters of mines in the adoption of good names, because the public are reminded of the riches yielded, which may inspire some confidence as to the results of working the new mines. May 30. R. S.

WELL-SELECTED MINES AS INVESTMENTS.

SIR.—You politely inserted a letter of mine "On Investment in Mines," some considerable time ago; and I think I may venture to affirm that the prospects of mining affairs as I then depicted them have been verified by the events which have since occurred, and by the present condition of the markets. Perhaps you will permit me to bespeak the attention of your readers to the aspect of mining interests at present.

Of course, everybody knows that business is very bad. Prices are low, buyers are few, foreign orders are languid and little business is doing except when speculative spirits arise, or some "bulling" or "bear" manœuvre is on foot, some particular property. But, on the whole, I am of opinion that the mining market is in an unwholesome state; stocks for the time of year are not large, and the consumption of lead, copper, tin, iron, and steel by a million of men in antiquism in the East of Europe, and in Asia Minor, is prodigious. Lead and copper in various forms are now being wasted with the prodigality only known to war, from Erzzerum to the borders of Georgia, along the Danube, and on the Euxine; and no one can tell how soon the area of this consumption and waste may be enlarged by the intervention of other powers. Manufacture of the munitions of war, into which metals so largely enter, is increasing on the part of our own Government, and the other Governments of Europe now at peace. Of course, should the threats of the Moscow and St. Petersburg pre be put in force, or attempted, the expenditure of iron, steel, and the superior metals on the part of our own Government will be vastly increased. War—wider war—must create a greater demand for lead, copper, and steel; and if the peace rumours which we hear from Buda-Pesth, Bucharest, and Vienna have any grounds to rest upon, the prospect of a legitimate commercial revival, now rendered uncertain by the dread of an extension of the war, will be revived. Suspense as to the probability of a war in far more destructive to business than war itself. One result of the present situation is that shares in good mining properties, dividend paying and prospective, are very cheap, probably no description of property ensuring such returns was ever at so low a price in this market: so that all sensible and prudent investors may now take up properties when the margin of profit is wide, and the certainty of returns indisputable. Lead mines are at present most popular, for reasons which of late have been frequently discussed in your Journal.

Permit me to point out Mynydd Gordin as a lead-bearing property of great promise. Shares are now in demand, but there is opportunity for capitalists to secure an interest which may not soon occur again, for this property is obviously destined to achieve a great success; and as the knowledge of this undeniable fact extends, the shares must proportionately increase in market value. There has been some fluctuation in the yield hitherto, but when some slight run off of lead took place the junction has been regained, and splendid improvements have taken place. The geological features of the country lend men of the first scientific knowledge to predict the wealth in store. It is observable that in the history of mines, all events of lead mines—where there has been a great property developed, there has always been fine surface indications, and such is here the case. The discoveries hitherto made have been of quality and degree to ensure to the proprietors a splendid result. This mine has the good luck of being well supported; its directors are earnest and competent. I shall be happy to give more explanations to any of my old clients, or any new enquirers who will place themselves at my disposal.

The Wye Valley property also bespeaks the attention of capitalists. The value of the shares is now very much depreciated, arising from the Barry Port failure, but a just reason for their depreciation, but you must know, Mr. Editor, that any large failure sends a shock of alarm into the circles of timid investors, which spreads like enlarging circles, edging from the concession of a stone with the river's surface until the last circle dies away in faintness. Wye Valley shares ought to be now bought. Most of your readers know the character of East Wales Shares in this mine are always worth buying, especially when, as now, they can be obtained at reduced prices from the combination of circumstances influencing the market.

Groggion Mine has been frequently brought under your notice lately. It is situated in a belt of metalliferous country, and promises large future wealth to its proprietors. The discoveries made there ensure very large profits hereafter.

Coal mines are in various instances good investments. The low price of coal has deterred capitalists for some time from embarking in this description of enterprise, but it ought to be recollected that the price of iron, railway carriage, and of all the description of machinery used in them has fallen in proportion, that the expense of labour has declined 15 and 20 per cent. Moreover, our exports have been rapidly advancing, and although we receive much less money during the active period called the coal famine the quantities have greatly augmented, and the charges for freight are less; and, on the whole, the margin of profit is as wide now as when coal sold for more. Our exports for France, which fell off during the time of dear prices, are now rising. For a time our former French customers repaired to Belgium, but after a fair trial the English mineral has the preference, and the prospect is that we shall have the great coal trade with France without rivals. It is also to be taken into account that stocks at our foreign depots, and in our home markets, have never been so low as at this period of the year, and must be replenished during the summer. The coal company has excellent wharves, which they also possess in Dublin, the coal imports of which for household purposes are of immense magnitude not only for its own consumption but for conveyance by the Grand and Royal Canals, and the Southern and Western Railways, into the interior. Dublin received nearly all its coal from Whitehaven, but now the Chapel House Collieries can dis-

posed of all their "take-out" there; and, in fact, the company has to buy coal, notwithstanding their present large output, until their vast property is more thoroughly developed. Shares will go up steadily in this investment, and I would advise my clients to buy while they can be procured at moderate terms. I shall be prompt in answering communications addressed to me, or in personally pointing out the desirableness of capitalists obtaining an interest in this essentially undertaking.

Exchange Buildings, June 1.

GEORGE BUDGE.

TIN PRODUCTION IN QUEENSLAND.

TO THE EDITOR OF THE WEST BRITON.

SIR,—I duly received your letter and the West Briton, for which I accept my best thanks. I should have answered the former before this had I not been away in the Bush on survey at a place where there was no postal communication with Brisbane. I have not been for many months now engaged on geological surveys, but some of our staff have lately returned from the interior, and I will give you an outline of their experience with regard to mineral resources of the colony of Queensland, so far as the new discoveries of the Hopkinson and Palmer rivers are concerned. The expedition to the Palmer river is, as I think, the more successful of the two with regard to alluvial gold, as the finds were extremely rich, and many made their fortunes in an incredibly short space of time; but these "pots" hardly compensated for the hardships the prospectors had to endure, losses by fevers, and by the fact that hundreds died where a few pulled through only to return actually shattered in health, although with plenty of gold to be spent on their medical moor. The "poor blacks" about the region of the Palmer proved themselves to be about the most determined savages that diggers have yet had to contend against in Queensland. They are cannibals, too, and many an unfortunate content against in Queensland. These poor fellows were slaughtered wholesale, and Canadian knows it to his cost. These people were lured by false promises, actually cut up and stowed in tin cans "planted" under bark. However, the Palmer, as police found several pieces of the past, and has now settled down into a steady reefing field, with a bright prospect of stability. Tin was found in large quantities during the alluvial fossicking, but was taken little notice of; it never is on a gold field. Whether this tin will be made use of in the future or not I cannot say; it is field. It would not pay for the carriage to Cooktown, the nearest shipping port. The Hodgkinson is purely a reefing field, and the tin is very scarce here. One of our staff, who undertook that the virgin g'dy can be made a fortune, and will never, I suppose, touch the conduct of the party—working men as well as leaders—are now rich men, and will, as soon as the machinery is in full working order, be millionaires —if, if the reefs continue to "hold out" going down. Another discovery has been made within a few miles of Stanthorpe, at a place called Rosenthal, where there is turning out 20 ozs. to the ton; this makes me think that the tin district

passing through the streaming bawse.

Now, with regard to the effect that our tin discoveries will have on the Cornish mines, all I can say is, if you have not already felt that the Queensland and Bacoa tin has materially affected your prospects up to the present time I do not see any reason for anxiety on that head in the future—at least not for many years at least—and for this reason. Queensland is not sending away nearly the amount of tin now that she was some time after the first discovery of that metal. Certainly fresh discoveries are being made, but then these discoveries never take advantage of lowness under the most favourable circumstances mean in each case where carriage is less than it is expensively raised. I am of opinion that if there were no tin in the matter in hand, and work the tin and copper ground capitalists were as well off as they are now, comparatively speaking, be ruined so far as their mining interests are concerned, but then we have no such men inclined to go into tin until railroads and good dray roads have been made, for until that time it is considered that, taking everything into consideration (bad roads and floods), no mining interest other than gold could be worked profitably at all distances from a shipping port; therefore I see no immediate cause for alarm. That Queensland is enormously rich in minerals is indisputable, and, from surveys made, I should consider her resources in that line inexhaustible, but the time is evidently not yet come for turning this wealth to account. There is a corps of Russian engineers now here on a survey, and they are perfectly astonished at the mineral lying idle in the ground. By the same token, we do not look with a very favourable eye on these gentlemen, and if war is declared I fancy they will get roughly handled. Stanthorpe, the centre of the great tin district, has not gone ahead in the least—has, I fancy, retrograded—and the amount of tin produced last week is about 160 tons, whereas at the same time last year it was from 150 to 200 tons. I am not aware what amount is raised on Vegetable Creek, in New South Wales, just over the Queensland border, but I do not think it exceeds the Stanthorpe raising.

The great thing in favour of the Cornish mines as compared with the Queensland is, we have as yet no lodes discovered; therefore the workings cannot be so permanent, and will be much sorer worked out. Whether miners, after having exhausted the stream tin, will turn their attention to prospecting for lodes is a thing for the future to decide. I fancy not, at least for many years, as the little of the ore-dis-

R. S. until all the much further than a large amount of tin. Copper lodes we have in
 ment in must look look at them. One "spec" after another has been dropped, and the land forfeited, not from paucity of ore, but from want of proper carriage
 venture to and cheaper labor for the miners so never wanted a pleader
 to feel them as a barrow their lives, rather too much for any adventurer's nerves.
 and fruit me Our new Land Act is just coming i- to force, and I return to my camp to morrow
 for more bush work: on my return, from time to time, I will let you know any
 thing that I think will interest your readers.
 J. VIVIAN WILLIAMS,
Suregores General's Office, Brisbane, Feb. 28,
 Staff Surveyor.

ORE SHIPMENTS.—The wool ships *St. Vincent* and *Moneta* from South Australia have arrived with shipments of 91 and 179 tons of wool, from the Yeakle Peninsula Company's Kuyilla Mine there.

ANOTHER ALPINE BONANZA.—It is gratifying to be enabled to announce another instance of the wisdom of changing the system of mining in this country, the tunnel having been generally drilled for the shaft. The sinking of the shafts have made the Exchequer and I. & L. at Silver Mountain, paying mines, and we now have to chronicle an important strike in the Advance Mine, at Monitor. The west drift of the Advance, at the 320, running towards the prospecting shaft in ledge 3, has penetrated ledge 2 70 ft., and not yet reached the footwall. The hanging wall of this ledge is well defined—course north, 16° east, dipping east on an angle of 82°. Several feet of rich ore is found on the hanging wall, and the entire ground through which drift has passed in this ledge is fine vein matter, thoroughly impregnated with mineral, and giving good assays in silver and gold, increasing in value as the footwall is approached. The northerly drift on this level is running on side of and parallel to ledge 2, all in pay rock, including some very rich quartz feers. No cross-cutting has been done in this drift yet, but the course of the several feeders it penetrates indicates that this pay belt extends considerably beyond the limits of the drift. Work in the mine at present is confined to cross-cutting No. 2 ledge and preparing the ground by drifts for extracting a supply of ore for the mill as soon as it can be made ready to start; but work on the shaft will soon be resumed and drifts run at a lower level. The Advance Company has been in operation about 18 months ago, and they have fine hoisting works and a three compartment shaft. The capacity of the hoisting works will soon be increased by the substitution of a new and much larger boiler than the one now in use. At no time in Monitor's history has the outlook for her taking a place among the great mining districts been so promising as at present, and if the Advance people continue to prosecute their work with the same good judgment and energy as heretofore, all the success that has been predicted for this camp will soon be realised; and this excellent illustration may be laid at the door of its efficient manager, B. Lingly, who has been untiring in his efforts about this new development. In addition to his duties as secretary, this gentleman acted as in manager of the mine, thus saving the company a large salary, and has been ably seconded by Superintendent Wm. Mercer, in running the mine economically and advantageously.—*Alpine Chronicle*.

UNTOLD WEALTH DISCLOSED BY A LUCKY FALL.—Perhaps richer specimens but certainly no more beautiful ones have ever been taken from any mine than are now being obtained from a recently discovered lode in Jimtown. The story runs that for months the miners in going to and from their daily labours, have travelled along a certain path, wearing the earth away to a rock. A vein was thus brought to light which presented no attractions to the prospector, and was trod upon as of no account. A labourer two weeks ago swung a sledge upon his shoulder and went one morning to his accustomed toil on the mountain side. Reaching the vein, he carelessly allowed the heavy stone breaker to fall upon a projecting point and thereby detached several pieces of the vein matter. The white character of the rock and its glittering particles disclosed to him one of the richest mines in the world. Literally fall were the white specimens with bright particles of almost pure gold, and a single shaft has been sunk to the depth of 1 ft., the rock increases in richness and at the bottom very thin strips of pure gold seem to hold together the fragmentary parts of the vein matter. Untold wealth is the sure possession of the men, Virdee and Griffin, who own this rich treasure vault of the hills.—*Denver (Colorado) News.*

CHEMICALS, MINERALS, AND METALS.—**Messrs. J. Berger Sponce** and Co. (May 30).—Acetate of Lime, 9*d*. 15*s*. per ton.—Alumina, Alum, 4*d*. 15*s*. for loose lump; ground, 7*d*. 15*s*.—Aluminous cake, 4*d*. 10*s*.—Ammonia: Sulphate, grey, 18*s*. 6*d*.; best London white, 19*s*.; muriate—white, 27*s*.; sal ammoniac, green, 45*s*.; seconds, 44*s*.—Acid: Tartaric, English, ground or crystal, 1*s*. 5*d*.; formic, 1*s*. 4½*d*.; crystals, oxalic, 5*d*.; sulphuric, 3*s*. 10*s*. to 3*s*. 15*s*.; picric acid, 1*s*. 4½*d*.; pure phos.—Arsenic: New Consols make 8*s*. 10*s*.—Bleaching Powder: At 5*d*.; for the whole year 1877, 6*s*. 15*s*.—Litharge: Best flint, 24*s*.—Metals: Iron Salts: Iron salts, green and yellow, 55*s*.; in tanks or barrels, 60*s*.—Copper Salts: Sulphated copper, 22*s*. 15*s*.—Magnesia: Epsom salts, 3*s*. 12*s*. 6*d*.—Nitrate of Soda: 14*s*. 6*d*. to 14*s*. 9*d*.—Potash: Muriate, 80 per cent., at 6*s*. 8*s*. 6*d*. f.o.b.: Prussiate, yellow, 10*s*. 6*d*.; chlorate, 9*d*.; bichrome, 4½*d*.—Soda: Cream caustic, 60 per cent., 1*s*. 11*s*. 6*d*.; white, 60 per cent., 12*s*. 7*s*. 6*d*.; soda ash, 1¾*d*. to 1¾*d*.; soda crystals, 4*s*. 5*d*.; bicarbonate, 11*s*.; salt cake, 2*s*. 16*s*.; Glauber salts, 2*s*. 15*s*. Sugar of Lead: Brown, 28*s*.; grey, 30*s*. 14*s*.; white, 37*s*.—Brimstone: Best thirds, 5*s*. 6*d*. 1.
—China-clay, 15*s*.—Cornmeal: "Rosen-lynn," 24*s*.; "BM," 3*s*.—Iron Ore: Hematite, 15*s*. to 22*s*. 6*d*.; Alginate, 5*s*. per cwt.; 1*s*. 6*d*.; Magnetite, 10*s*. 6*d*.; phosph. for 70 per cent.—Pyrites: Spanish cupreous, 5½*d*.; non-cupreous, 6¾*d*. Phosphate of Alumina, 3*s*. to 3*s*. 10*s*. per ton.—Phosphates: High strength, 80 to 85 per cent., 1*s*. 6*d*. to 1*s*. 5*d*. per unit; Estremadura, 1*s*. 3*d*.; ordinary, 60 per cent., 1*s*. 4½*d*. per unit. Hematite: No. 1, 47*s*. 6*d*.; No. 2, 42*s*. 6*d*.; No. 4 (foundry), 4*s*. 6*d*.; No. 4 (forge), 4*s*. net. Hematite: No. 1, 7*s*.; No. 2, 6*s*. 6*d*.; No. 3, 6*s*. 6*d*.; No. 4, 6*s*. 6*d*.; No. 5 (mottled and white), 6*s*. 6*d*.—Bessemer, No. 1, 7*s*.; No. 2, 6*s*. 6*d*.; No. 3, 6*s*. 6*d*.; less 2*s*. 6*d*. e.—Scotch: No. 1, 6*s*. 6*d*.; No. 2, 6*s*. 6*d*.; No. 3, 6*s*. 6*d*.; No. 4, 6*s*. 6*d*.; No. 5, 6*s*. 6*d*.; No. 6, 6*s*. 6*d*.; No. 7, 6*s*. 6*d*.; No. 8, 6*s*. 6*d*.; No. 9, 6*s*. 6*d*.; No. 10, 6*s*. 6*d*.; No. 11, 6*s*. 6*d*.; No. 12, 6*s*. 6*d*.; No. 13, 6*s*. 6*d*.; No. 14, 6*s*. 6*d*.; No. 15, 6*s*. 6*d*.; No. 16, 6*s*. 6*d*.; No. 17, 6*s*. 6*d*.; No. 18, 6*s*. 6*d*.; No. 19, 6*s*. 6*d*.; No. 20, 6*s*. 6*d*.; No. 21, 6*s*. 6*d*.; No. 22, 6*s*. 6*d*.; No. 23, 6*s*. 6*d*.; No. 24, 6*s*. 6*d*.; No. 25, 6*s*. 6*d*.; No. 26, 6*s*. 6*d*.; No. 27, 6*s*. 6*d*.; No. 28, 6*s*. 6*d*.; No. 29, 6*s*. 6*d*.; No. 30, 6*s*. 6*d*.; No. 31, 6*s*. 6*d*.; No. 32, 6*s*. 6*d*.; No. 33, 6*s*. 6*d*.; No. 34, 6*s*. 6*d*.; No. 35, 6*s*. 6*d*.; No. 36, 6*s*. 6*d*.; No. 37, 6*s*. 6*d*.; No. 38, 6*s*. 6*d*.; No. 39, 6*s*. 6*d*.; No. 40, 6*s*. 6*d*.; No. 41, 6*s*. 6*d*.; No. 42, 6*s*. 6*d*.; No. 43, 6*s*. 6*d*.; No. 44, 6*s*. 6*d*.; No. 45, 6*s*. 6*d*.; No. 46, 6*s*. 6*d*.; No. 47, 6*s*. 6*d*.; No. 48, 6*s*. 6*d*.; No. 49, 6*s*. 6*d*.; No. 50, 6*s*. 6*d*.; No. 51, 6*s*. 6*d*.; No. 52, 6*s*. 6*d*.; No. 53, 6*s*. 6*d*.; No. 54, 6*s*. 6*d*.; No. 55, 6*s*. 6*d*.; No. 56, 6*s*. 6*d*.; No. 57, 6*s*. 6*d*.; No. 58, 6*s*. 6*d*.; No. 59, 6*s*. 6*d*.; No. 60, 6*s*. 6*d*.; No. 61, 6*s*. 6*d*.; No. 62, 6*s*. 6*d*.; No. 63, 6*s*. 6*d*.; No. 64, 6*s*. 6*d*.; No. 65, 6*s*. 6*d*.; No. 66, 6*s*. 6*d*.; No. 67, 6*s*. 6*d*.; No. 68, 6*s*. 6*d*.; No. 69, 6*s*. 6*d*.; No. 70, 6*s*. 6*d*.; No. 71, 6*s*. 6*d*.; No. 72, 6*s*. 6*d*.; No. 73, 6*s*. 6*d*.; No. 74, 6*s*. 6*d*.; No. 75, 6*s*. 6*d*.; No. 76, 6*s*. 6*d*.; No. 77, 6*s*. 6*d*.; No. 78, 6*s*. 6*d*.; No. 79, 6*s*. 6*d*.; No. 80, 6*s*. 6*d*.; No. 81, 6*s*. 6*d*.; No. 82, 6*s*. 6*d*.; No. 83, 6*s*. 6*d*.; No. 84, 6*s*. 6*d*.; No. 85, 6*s*. 6*d*.; No. 86, 6*s*. 6*d*.; No. 87, 6*s*. 6*d*.; No. 88, 6*s*. 6*d*.; No. 89, 6*s*. 6*d*.; No. 90, 6*s*. 6*d*.; No. 91, 6*s*. 6*d*.; No. 92, 6*s*. 6*d*.; No. 93, 6*s*. 6*d*.; No. 94, 6*s*. 6*d*.; No. 95, 6*s*. 6*d*.; No. 96, 6*s*. 6*d*.; No. 97, 6*s*. 6*d*.; No. 98, 6*s*. 6*d*.; No. 99, 6*s*. 6*d*.; No. 100, 6*s*. 6*d*.; No. 101, 6*s*. 6*d*.; No. 102, 6*s*. 6*d*.; No. 103, 6*s*. 6*d*.; No. 104, 6*s*. 6*d*.; No. 105, 6*s*. 6*d*.; No. 106, 6*s*. 6*d*.; No. 107, 6*s*. 6*d*.; No. 108, 6*s*. 6*d*.; No. 109, 6*s*. 6*d*.; No. 110, 6*s*. 6*d*.; No. 111, 6*s*. 6*d*.; No. 112, 6*s*. 6*d*.; No. 113, 6*s*. 6*d*.; No. 114, 6*s*. 6*d*.; No. 115, 6*s*. 6*d*.; No. 116, 6*s*. 6*d*.; No. 117, 6*s*. 6*d*.; No. 118, 6*s*. 6*d*.; No. 119, 6*s*. 6*d*.; No. 120, 6*s*. 6*d*.; No. 121, 6*s*. 6*d*.; No. 122, 6*s*. 6*d*.; No. 123, 6*s*. 6*d*.; No. 124, 6*s*. 6*d*.; No. 125, 6*s*. 6*d*.; No. 126, 6*s*. 6*d*.; No. 127, 6*s*. 6*d*.

GOVERNMENT INSPECTION OF MINES.

THE INSPECTORS' REPORTS.

The Official Reports for 1876 have just been issued, and are somewhat more favourable. The deaths in connection with colliery operations were but 933, against 1244 in the preceding year. It appears that 159,688 tons of coal were wrought for each life lost, whilst in the preceding year only 118,730 tons were wrought for each life lost; yet some districts show an un-satisfactory decrease in the quantity got for each life lost; in South Durham, for example, the figures are 255,408 tons, against 261,796 tons; and in East Scotland they are 168,029 tons, against 198,614 tons. During the year reported upon there were employed in and about the mines under the Coal Mines Regulation Act 514,532 persons, who raised 134,125,166 tons of coal, 2,071,983 tons of fire-clay, 12,159,580 tons of iron-tone, and 632,656 tons of shale, &c.—together 148,989,355 tons. There was one life lost for each 551 persons employed. During the preceding year 133,306,485 tons of coal, 1,932,294 tons of fire-clay, 12,018,594 tons of ironstone, and 442,940 tons of shale, &c., were produced in the mines classed under the Coal Mines Regulation Act, including a quantity of iron pyrites, &c., found in working these mines. Comparing the above quantities it will be seen that the output of coal has increased less than 1 per cent. During 1875 there was one life lost for each 430 persons employed. The number of collieries at work in 1876 was 4385, against 4501 in the preceding year. We subjoin our usual tabulated summary, which will permit of the several classes of accidents being compared:—

COAL MINES—1875.

Names of districts.	Separate accidents.					Deaths resulting.				
	Explosions of fire-damp.	Falls of coal, sides and roof.	In shaft.	Miscd., in mine and at surface.	Total.	Explosions of fire-damp.	Falls of coal, sides and roof.	In shafts.	Miscd., in mine and at surface.	Total.
Northumberland, Cumberland, & North Durham	3	24	5	40	72	4	24	5	40	73
South Durham & Westmoreland.	1	35	10	39	76	1	35	10	39	76
Cleveland, ironstone	—	12	3	13	28	—	13	3	13	29
North and East Lancashire	1	33	10	19	63	2	38	11	24	75
Ireland	—	2	—	1	3	—	2	—	2	4
West Lancashire and North Wales	4	58	20	29	111	6	62	29	32	129
Yorkshire	6	61	9	28	104	162	63	18	28	263
Ditto, coal field ironstone	—	—	—	1	—	—	—	—	4	4
Ditto, Lincolnshire ironstone	—	—	—	—	—	—	—	—	—	—
Derby, Nottingham, Leicester, Warwick	1	26	16	21	64	1	26	17	21	65
Ditto, ironstone and fire clay	—	1	1	—	2	—	1	1	—	2
North Staff., Cheshire, Salop.	3	14	9	10	36	46	14	9	20	89
Ditto, ironstone	—	9	3	2	14	—	9	5	2	16
South Staff. and Worcestershire	6	35	11	17	69	6	36	12	21	75
Ditto, ironstone and fire clay	1	3	2	3	9	1	3	2	3	9
Monmouth, Gloucester, Somerset, and Devon	5	30	8	11	54	32	22	8	11	83
Ditto, ironstone	—	1	—	2	3	—	1	—	2	3
South Wales	4	41	21	37	103	20	45	22	39	126
Ditto, ironstone	—	1	—	—	—	—	—	—	—	—
East Scotland	2	25	12	15	54	2	26	13	18	59
Ditto, ironstone and shale	1	2	—	—	5	—	2	—	—	5
West Scotland	4	20	7	9	40	5	20	7	13	45
Ditto, ironstone and shale	—	6	4	2	12	—	6	5	2	13
Total coal mines	40	404	138	274	852	87	422	154	299	1162
Total iron, fire clay, and shale.	1	55	15	24	75	1	36	18	27	81
Gross total	41	439	153	294	927	288	458	172	326	1244

COAL MINES—1876.

Northumberland, Cumberland, & North Durham	2	34	5	26	67	3	35	5	27	70
South Durham & Westmoreland	2	42	5	26	75	5	42	5	26	78
Cleveland, ironstone	1	7	—	8	16	1	7	—	8	16
North and East Lancashire	3	22	5	14	44	5	24	7	15	51
Ireland	—	—	—	—	—	—	—	—	—	—
West Lancashire and North Wales	11	60	16	28	115	14	61	18	28	121
Yorkshire	3	35	9	22	69	3	35	9	22	69
Ditto, coal field ironstone	—	1	—	1	—	—	1	—	—	—
Ditto, Lincolnshire ironstone	—	1	—	—	—	1	—	—	—	—
Derby, Notts, Leicester, Warwick	1	41	7	17	66	6	40	8	17	77
Ditto, ironstone	—	—	—	—	—	—	—	—	—	—
North Staff., Cheshire, Salop.	3	17	8	14	42	11	17	8	16	52
Ditto, ironstone	—	—	—	—	—	—	—	—	—	—
South Staff. and Worcester-shire	4	31	15	22	72	5	33	18	22	78
Ditto, ironstone	—	1	1	—	2	—	1	1	—	2
Monmouth, Gloucester, Bomer-set, and Devon	4	28	6	9	47	29	29	6	9	73
Ditto, ironstone	—	1	—	—	1	—	1	—	—	1
South Wales	3	51	19	38	111	4	54	20	39	111
Ditto, ironstone	—	—	—	—	—	—	—	—	—	—
East Scotland	1	33	12	14	60	2	35	12	21	70
Ditto, ironstone and shale	—	3	4	1	8	—	3	4	1	8
West Scotland	4	18	5	4	31	7	20	5	4	36
Ditto, ironstone and shale	—	2	3	2	7	—	2	3	3	8
Total coal and fire-clay mines	41	413	112	134	890	94	432	121	246	893
Total ironstone and shale mines	1	17	8	13	39	1	17	6	14	40
Gross total	42	430	120	247	839	95	449	129	260	933

The number of persons employed during 1876 in and about the mines classed as metalliferous was 57,497, against 58,073 in the preceding year. Of these, 34,169 were employed underground, and 23,388 at surface. Of the latter, 242 (219 in Cornwall and Devon) were females under 13 years of age; 1190 (963 in Cornwall and Devon) were females between 13 and 18; and 2141 (1792 in Cornwall and Devon) were females above 18: total females, 3573, or about 15 per cent. No females are employed underground. From the subjoined summary it will be seen that in the aggregate the following quantities of mineral were produced during the two years reported

MINEG PRODUCE.		1875—tons.	1876—tons.
Arsenic (obtained at the mines) .....	...	3,783	4,091
Arsenical pyrites .....	...	12,948	12,949
Auriferous pyrites .....	...	10	—
Barytes .....	...	15,845	21,283 14-20
Bismuth and cobalt ores, mixed .....	...	—	2-5
Black marble .....	...	20	—
Bluestone .....	...	650	50
Building stone .....	...	144,714	199,002
Cale spar .....	...	1,237	1,600
Cement stone .....	...	—	940
Chert .....	...	3,940	3,790
Copper ore .....	...	66,214	71,741
Copper precipitate .....	...	21	750 17-20
Dross spar .....	...	34	66
Fire sand .....	...	273	—
Fire clay and brick-earth .....	...	—	45
Flagstone .....	...	48,000	unknown
Fluor-spar .....	...	324	340
Gaister .....	...	750	889
Gold .....	...	—	8 ozs. 24 lb. 50. 13d. 6g.
Gold ore .....	...	—	13 grs. 7 lbs.
Gold quartz .....	...	122	—
Gypsum .....	...	65,068	68,276
Iron ore .....	...	2,673,899	2,617,546
Iron pyrites .....	...	18,115	18,552
Jet .....	...	70,613	unknown
Lead ore (dressed) .....	...	3,880	73,448 18-20
Lead ore (undressed) .....	...	20	3,653
Lignite .....	...	499,027	551,009
Limestone .....	...	3,373	—
Lithomarge .....	...	3,725	2,797
Manganese .....	...	5,045	3,640
Ochre and amber .....	...	122	188
Phosphate of lime .....	...	46,686	49,117
Pipe clay and potter's clay .....	...	—	—
Plumbago .....	...	—	unknown
Parbeck stone for paving, kerbs, &c. .....	...	191,119	186,841
Rock salt (exclusive of the white salt made from brine) .....	...	1½	1 40
Silver precipitate containing copper .....	...	153,282	155,887
Slate and slabs dressed .....	...	151	75
Stearite .....	...	161	120
Stamping stone .....	...	11,615	12,008
Tin ore dressed (black tin) .....	...	—	—
Tin ore partially dressed (whites), estimated to contain 34 tons of black tin .....	...	—	168
Tin ore undressed (tinstuff), estimated to contain 796 and 565 tons of black tin .....	...	25,205	13,485
Whinstone .....	...	11,463	14,922
Woolfram .....	...	45	10
Zinc ore .....	...	23,342	23,679 7-20

The fatal accidents at the mines, classed under the Metalliferous Mines Regulation Act, in Great Britain and Ireland amounted to

only 66, against 110 in the preceding year, showing an improvement equal to 40 per cent. From these accidents the number of deaths resulting was 70, only four of the accidents having caused the loss of more than one life. It appears that in 1875, in the mines classed under the Metalliferous Mines Regulation Act, there was one fatal accident amongst every 527 persons employed in and about the mines, and one death by accident amongst every 488 persons employed; and in 1876 one fatal accident among every 871 persons, and one death by accident amongst every 821 persons employed in and about the mines. The subjoined summary will facilitate the comparisons:—

METALLIFEROUS MINES-1875.

Names of districts.	Separate accidents.					Deaths resulting.				
	Falls of ground.	In shafts.	Miscellaneous underground.	At surface.	Total.	Falls of ground.	In shafts.	Miscellaneous underground.	At surface.	Total.
Northumberland, Cumberland...	8	7	3	—	18	8	8	3	—	19
Durh., Westm., and No. Yorks...	1	—	—	1	1	1	—	—	—	1
North Wales, Isle of Man, &c...	1	5	11	5	27	8	6	12	7	33
Glouc., Monm., Somerset, &c...	1	1	2	—	4	2	2	2	2	8
Glam., Pembroke, &c...	1	—	—	—	1	—	—	—	—	1
Cornwall, Devon, &c...	7	16	13	8	44	7	16	15	8	46
East Scotland	1	1	—	—	2	1	1	—	—	2
West Scotland	1	1	—	—	2	1	1	—	—	2
Ireland	2	2	—	2	6	2	2	—	2	6
Total	30	33	30	17	110	32	33	33	19	119

METALLIFEROUS MINES—1876

Northumberland, & Cumberland ..	7	7	3	—	17	7	9	3	—	19
Durh., Westm., & No. Yorks ..	—	—	—	—	—	—	—	—	—	—
Cheshire, Lancashire, and Sussex ..	1	—	1	—	2	1	—	1	—	—
Derbyshire and Nottingham	1	1	—	2	—	1	1	—	—	2
North Wales, Isle of Man, &c.	5	1	8	2	16	5	1	8	2	16
South Staffordshire & Worcester ..	—	1	1	—	1	—	1	—	1	1
Glouc. Moun., Somerset, &c.	1	—	—	—	—	—	—	—	—	—
Cornwall, Devon, &c.	9	4	5	19	7	5	1	4	21	21
East Scotland	1	—	1	—	2	1	—	1	—	2
West Scotland	—	—	1	—	1	—	1	—	1	1
Ireland	1	—	—	—	1	1	—	—	—	1
Total	24	13	23	6	66	25	16	23	6	70

The subjoined tables show, amongst other things, that the increase in the output of coal has been unimportant having amounted to only 818,681 tons, the figures being 134,125,166 tons in 1876, against 133,303,485 tons in the preceding year. There was a slight diminution in the number of collieries at work, the figures being 4385 for 1876, against 4501 in the preceding year. The subjoined tables also show the relative safety of the several districts; and it will be seen that in those most celebrated for good management and strict discipline the casualties have been fewest:—

1875.

Names of districts.	As computed by each Inspector for his own district.		Per separate fatal accident.	No. employed per life lost.	Tons of mineral raised per separate fatal accident.	Tons of mineral raised per life lost.	Number of mines.
	Males employed.	Tons mineral raised.					
Northumberland, Cumberland, & N. Durham } Do., ironstone } So. Durham, Westmidland, & N. Riding of Yorks. {	50,070	14,042,822	695	686	199,545	196,512	216
Cleveland ironstone { North & East Lancashire { Ireland { Do., ironstone { W. Lancashire & N. Wales { Do., ironstone { Yorkshire { Do., ironstone { Do., Lincolnshire ironstone { Derby, Notts, Leicester, & Warwick { Do., ironstone { North Staff., Cheshire, & Shropshire { Ditto, ironstone { Stth. Stafford & Worcester { Do., ironstone { Monmouth, Somerset, part Glam., & Brecon. { Do., ironstone { South Wales { Ditto, ironstone { East Scotland { Do., ironstone { West Scotland { Do., ironstone {	58,622	19,459,248	771	771	261,796	261,796	211
	9,761	6,085,541	348	337	217,341	209,884	46
	33,006	8,881,137	524	440	142,358	119,874	373
	1,544	128,201	515	386	45,087	33,815	48
		300	—	—	—	—	—
	45,136	11,398,032	407	349	103,252	88,845	313
		20,151	—	—	—	—	—
	62,190	15,855,990	695	234	165,016	60,962	520
		268,282	—	—	—	—	—
	269	118,770	—	—	—	—	10
	52,477	12,340,600	795	783	191,538	188,699	422
		156,700	—	—	—	—	—
	30,056	6,116,194	601	286	166,888	78,494	250
		2,164,440	—	—	—	—	—
	35,668	10,300,000	457	424	139,940	129,944	573
		384,055	—	—	—	—	—
	34,136	6,113,413	598	397	112,935	74,852	408
		223,309	—	—	—	—	—
	51,248	9,383,341	493	404	98,795	80,903	362
		176,610	—	—	—	—	—
	41,314	11,419,619	666	645	205,021	198,614	379
		89,665	—	—	—	—	—
	30,348	7,177,888	584	523	174,368	156,330	375
		1,642,002	—	—	—	—	—
Totals and averages.....	535,845	145,325,079	578	430	159,331	118,730	450

* The total quantity of ironstone from the different districts was 12,018,594 tons; which, added to 133,306,485 tons of coal, gives the total of 145,325,079 tons.

1876.

Northumberland, Cum- berland, & N. Durham Do, ironstone.....	48,754	14,135,104	728	696	218,773	207,968	218
Do, Durham & Westm., & N. Riding of Yorks., Yorkshire—Cleveland ironstone.....	58,380	19,513,056	778	748	265,625	255,408	212
North & East Lancashire..	9,851	7,567	616	616	410,748	410,748	46
Ireland.....	30,382	6,564,101	690	505	192,098	165,732	371
West Lancashire and North Wales.....	1,365	125,195	—	—	—	—	—
Do., ironstone.....	42,174	11,509,339	366	348	100,762	95,765	312
Yorkshire.....	—	22,204	—	—	—	—	—
Do., ironstone.....	61,017	15,129,506	872	872	232,184	222,184	539
Lincolnshire ironstone.....	—	210,116	—	—	—	—	—
Derby, Leicester, Notts., and Warwickshire.....	244	154,287	214	244	154,287	154,287	10
Do., ironstone.....	52,348	12,331,546	793	679	189,394	162,338	419
North Staff., Cheshire, and Shropshire.....	—	121,379	—	—	—	—	—
Do., ironstone.....	27,779	5,559,106	603	496	164,600	135,207	250
8th. Stafford & Worcester. Do., ironstone.....	—	7,868,730	—	—	—	—	—
Monmouth, Somerset, Dorset, & Brecon.....	32,798	10,000,000	443	410	141,718	131,089	509
South Wales.....	—	294,842	—	—	—	—	—
Do., ironstone.....	33,244	7,121,209	692	449	153,918	99,838	415
Do., ironstone.....	—	142,745	—	—	—	—	—
Do., ironstone.....	46,319	11,963,447	418	396	108,130	102,584	385
Do., ironstone.....	—	192,397	—	—	—	—	—
Do., ironstone.....	40,832	11,667,648	600	523	192,739	168,029	367
Do., ironstone.....	—	836,873	—	—	—	—	—
Do., ironstone.....	29,045	6,697,904	764	660	236,995	204,677	343
Do., ironstone.....	—	1,710,454	—	—	—	—	—
Totals and averages.....	514,532	146,984,746	412	551	177,550	150,882	422

* The total quantity of ironstone from the different districts was 12,159,580 tons; which, added to 134,125,166 tons of coal, gives the total of 146,284,746 tons.

The above tables really embrace all the general statistics contained in the reports, and a large amount of information as to the precise circumstances under which the several accidents happened is given in the reports for each district. As usual, the reports supply many valuable suggestions and observations of a practical character, which will be fully referred to in subsequent Journals.

RAISING HEAVY WEIGHTS.—The improved method of raising heavy weights, invented by Mr. T. THOMSON, of Bluff Harbour, Otago New Zealand, consists in canting the weight from side to side, supporting it alternately on one or two points near to and on either side of the centre, but not so far as to make it unsteady, and then building up or raising the support underneath it on the higher side, so that on power being applied to the weight to be raised, or to its lever, the built up or raised side would form a fulcrum for it to work upon. As soon as the weight is canted to its opposite side the same process must be repeated, so that each side will alternately become the higher of the two. Instead of being built up the supports in some instances have pawls attached to them to fit into the teeth of vertical ratchets, so that the increased height obtained by the canting of the weight from side to side might be thereby retained.

SKERNE IRONWORKS COMPANY.

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Mr. STANFORTH reminded the shareholders that he was not a director at the time the company was formed, and, in fact, only became a director when the interests of the vendors and the shareholders absolutely ceased to be divergent. He had no interests apart from the interests of the shareholders; on the contrary, he was a large shareholder, and, therefore, deeply interested in seeing the company successful, and he might add that he had rendered considerable service to the company. In saying this he did not wish in any way to urge his claim to be a director, but to order that the shareholders might fully understand the position of affairs.

On the motion of the CHAIRMAN, seconded by Mr. EDENSON, Mr. H. Labouchere was then re-elected a director.

On the motion of the CHAIRMAN, seconded by Mr. KOSSUTH, Mr. Stanforth was then re-elected a director, two or three hands being held up against it.

On the motion of a director, only two were then formally declared, payable on Aug. 1, on a dividend of 3s. per share was 1877.

A dividend of the two coupons was 1877.

On the motion of Mr. BARRETT, seconded by Mr. NORTON, the auditors, Messrs. Barclay and Clay, were re-appointed.

In reply to a Shareholder, Mr. KOSSUTH explained that with the mines so far away, and with the system which he had established of paying for the work done in the month at the end of the next month, after which only the posting up can be attended to, it was extremely difficult to get the accounts over here in time to be presented to, so enable the meeting to be held at an early period.

The CHAIRMAN said the directors would do their best to have the meetings held as early as possible, particularly when they saw their way to be able to give a large dividend. The formal business of the meeting was now closed, but there was a larger matter which he wished to bring before the shareholders. The company owing its existence had had to contract bearing debts, which necessitated the payment every year of a heavy amount in the shape of interest. The board were now negotiating with the view of devising some scheme by which the amount of interest to be paid yearly would be materially lessened; these negotiations had not yet reached a point that they could be laid before the shareholders, but as soon as some definite arrangement was arrived at a special meeting would be called, and the arrangement laid before the shareholders. (Hear, hear.)

A special and warm vote of thanks was then passed to Mr. Kossuth for his able and warm vote of thanks to the company.—Mr. KOSSUTH acknowledged the vote.

A vote of thanks was then passed to the Chairman and directors, and the meeting broke up.

DEVON GREAT CONSOLS COMPANY (LIMITED).

The half-yearly general meeting of shareholders was held at the company's offices, Gresham House, on Tuesday, Mr. W. A. THOMAS in the chair.

[illegible]

will have the pleasing prospect that the ore reserves throughout the different mines amount to 3,340 tons, an increase during the past year of 1968 tons, and the new machinery for dressing the accumulations of halvaans being now complete and in the working order, we hope soon to increase the returns to 1000 tons per month."

THE CHAIRMAN said that as the reports and accounts were in the hands of every member, having been forwarded to them several days previously, he was not aware that there was any additional information that he could give them, but if anything occurred to any shareholder upon which further information was desired, he would be glad to answer any question that might be asked.

A SHAREHOLDER remarked that there was one or two items in the accounts to which he would like to refer. The expenditure on the mining account was shown to be 21,523*l.* 13*s.* 11*d.*, and the receipts 19,473*l.* 2*s.* 7*d.*, showing an apparent loss of 2050*l.* 11*s.* 4*d.*; whilst on the reduction account the receipts were 8560*l.*, and the expenditure 2422*l.* 13*s.* 1*d.*, leaving a profit of 4717*l.* 6*s.* 11*d.*; so that deducting one from the other there was a net profit of 2650*l.* 15*s.* 7*d.* This appeared to be an undue charge upon the mining account, but it was probably accounted for, because he saw that the reduction account was not charged with the cost of the raw material, and the mining account was not credited with its value. He would further

ask whether the company was committed for any considerable time for its arsenic, and whether the contractor was bound to take all the arsenic made? He wished it to be publicly stated whether the company was in the position of the merchant or the contractor.

Mr. DRAYTON was astonished that the gentleman who had just spoken came there to ask such a question, especially as he asked it, not in the interest of the shareholders, but in that of their greatest opponent. They all knew his (Mr. Drayton's) position, but he would certainly say that the question was one which, in the interest of the company, ought not to be pressed.

The CHAIRMAN thought it was a great pity that individual interests should be introduced. The directors had made a contract which, as representing the shareholders, they were very well satisfied with, and he believed the shareholders had confidence that the directors would carefully guard their interests. (Unanimous expression of approval.) If they were to be interfered with by every one interested in getting a contract, and required to make public the details of every contract made, the interests of the company would be entirely sacrificed, and they could not tell where it would stop; they might have everything questioned down to the setting of a tribute pitch. He suggested that the question should be withdrawn. As to the accounts, they showed only items of cash absolutely received, and the expenditure actually made. They had actually received on account of arsenic 8550*l.*, and nothing was stated in the account but what had been received.

The SECRETARY explained that they allowed Messrs. Drayton a month to take the arsenic away, and then one month's credit. He received 1800*l.* for arsenic on the previous Saturday from Messrs. Drayton, and would receive a similar amount in the ensuing month. As to the charges to the mining and reduction departments it was obvious that there was no charge made for the raw material, because the accounts were not separated. As to the quantity of mundaic used to make the arsenic he could tell them the exact quantity that had—

Several SHAREHOLDERS interrupted by stating that these were purely trade questions which it was obviously not to the interest of the company to make public, and they requested that they be not answered.

Mr. RICHARDSON enquired how much deeper they had to go by their contract with the Duke, and whether they had considered the question of using boring machines?

THE CHAIRMANS said that they had to sink 10 fms. deeper to the 300. They had had one experiment with a boring machine, and it did not answer; they were, therefore, now profiting by the experience of others, and waiting to determine which machine it is best to adopt. They were only compelled to sink Richards's shaft to the 350, and then drive four levels—east, west, north, and south—80 fms., but long before they had done that they hoped to discover something valuable.

A SHAREHOLDER enquired whether their chances were not considered hopeless already?

Mr. MORRIS (resident director) scarcely thought so, and miners had always to be hopeful. For his own part he considered their prospects very encouraging, and if the shareholders asked the gentlemen who inspected for the Duke before the new exploratory work was commenced they would tell them that the prospects were quite satisfactory to them. They had been working on the side of the lode (which was a hard capel), so as to be able to sink more cheaply. The ground had very much changed within the last month, and they had now been able to set 10 fms. certain at 60*l*. per fathom instead of 100*l*. per fathom, which was a very favourable feature. He continued, in reply to a shareholder, that they would have no great distance to drive to reach the lode when they got down to the 300; in fact, part of the shaft was in the lode at the 280. The reason the income tax appeared in the accounts was that they were compelled to make a return on the last five years; the income tax received on the other side of the account was the difference between the five years average and the three years average which they subsequently got back. He thought there was every probability of their reaching the 300 as had been anticipated.

A SHAREHOLDER understood that there was an intention of declaring a dividend, and would be glad to know what amount it would be?—The CHAIRMAN believed they would have the pleasure in June or July of declaring a dividend, but he never had and never

would consent to make a dividend except out of real profits actually in hand. They were in a good position. They had, as they would see from the agent's report, 33,000 tons of ore in reserve, and a large quantity of arsenical mundic on the mine not worked up.

The report and accounts were then unanimously received and adopted, and 30 guineas were voted for promoting the education of the children at Devon Great Consols, and for subscriptions to the dispensary and other charities at Tavistock.

Upon the proposition of Mr. TREHERNE, seconded by Mr. NORTON, the directors—Messrs. W. A. Thomas, Peter Watson, H. Stanley Morris, and T. Morris—were unanimously re-elected, and 400 guineas were voted to them for their past year's services. The auditors—Messrs. J. D. Browne and G. T. Rait—were re-appointed, and 40 guineas voted to them for their past year's services.

Mr. PETER WATSON (a director) would like to put one question right which had been raised—as to the loss on copper and profit on arsenic. It had been already stated that the accounts only included actual receipts and actual expenditure. They would be able to see the actual profits made by looking at the figures for 1876 and those of the present year. They would observe that their balance at the end of April, 1876, was 5936*l*. 13*s*. 9*d*.; there was a steam-engine sold for 500*l*., which of course could not be regarded as profit, and they had received 256*l*. for calls. If to these items they added 2432*l*. 8*s*. 10*d*., the profit for the 12 months, they would see that the total was exactly 9125*l*. 2*s*. 7*d*., which was the credit balance to the end of April, 1877, as shown in the accounts. Now, as a 5*s*. dividend would absorb 2560*l*., it was obvious that the directors, following the principle explained by the Chairman, could not that day declare a dividend of 5*s*., but they would undoubtedly have profits in hand to enable them to do so within one or two months.

The best thanks of the meeting were voted to the Chairman for his valuable services to the company; and upon the proposition of Mr. TREHERNE, seconded by Mr. PETER WATSON, a unanimous vote of thanks were given to Mr. Alexander Allen for the great ability and energy with which he had always and continues to perform the duties of secretary. It was mentioned that the Chairman and some other directors and the secretary have now been in office more than 33 years.

Mr. ALLEN having acknowledged the compliment, the meeting separated.

CARN BREA MINING COMPANY.

A three-monthly meeting of adventurers was held at the mine, on Thursday.—Capt. WILLIAM TEAGUE, the purser and manager, presiding. The accounts showed a loss on the three months' working of 176*l.* 1*s.* 1*d.* At the last meeting the balance against the mine was 2001*l.* 7*s.* 7*d.*, and this is now increased to 2177*l.* 8*s.* 8*d.* It was not proposed to make a call, but to carry forward the balance to the debit of the next account. The agents, in their report, having set forth the value of the different points in the mine, stated that as yet they had not seen enough of the Diamond rock-drill to enable them to offer an opinion upon its merits. They fully expected that greater progress would have been made before this, but the arrangements did not as yet seem perfect for driving. The report and accounts having been passed,

Capt. TEAGUE said he considered it would be to the interest of the mine, and greatly to his own convenience as manager and pursuer, that they should alter their banking account. He had consulted some of the large adventurers in the mine on the subject, and they were in favour of the proposed change. Therefore, with the view of effecting that arrangement, he intended to transfer the £100,000 to be transferred from the Union Bank, at Helston, to Messrs. Bolitho's Mount's Bay Bank, at Fanzance, and that the pursuer be authorised to overdraw the account in the ordinary for the proper working of the mine. This step had not been suggested in his letter, but he was sure that you would not object to it. He moved the resolution, which was carried unanimously.

—N. A. HINGSTON seconded.

Capt. TRAGUE said the adventurers would see that the mine must be looking remarkably well to be in a position to return just 280 tons of tin in three months. He had been comparing the prices of the present time with those that were being paid for tin in the United States, and he was sure that the present prices had been obtainable now as then, it would have made a difference to them of something like 10,400. Their anticipations as to the quantities of tin they would be able to return had been fully borne out by the results, and he trusted that they would go on in the same way in the future. He would, of course, anything in the shape of an increase in price would assist them, and enable them to present a very different statement of accounts.

TINCROFT MINING COMPANY.

At the mine on Thursday, a three-monthly meeting of adventurers was held.—Capt. TEAGUE presiding. The accounts showed a profit on the three months' working of 1460*l*. 8*s*. 10*d*. A credit balance of 55*l*. 10*s*. 6*d*. was brought forward from the last account, so that there was now available for dividend 1515*l*. 19*s*. 4*d*. The report and accounts were passed, and a dividend of 8*s*. per share was declared.

Mr. HINGSTON proposed a vote of thanks to the manager and other agents for their management of the mine, and in so doing he said he thought that, looking at all the circumstances, they had reason to be satisfied with the position of the two mines. He said the quantity of tin sold during the period quoted was a fair tale; but unfortunately the adverse market was doing little or no advantage from it. He would like to hear what Capt. Teague had to say with regard to the future, and anything cheering would be accepted with gratitude. It was a matter of thankfulness to know that although there was a large quantity of tin in the market it was pretty well absorbed, and that it did not lie on hand to any great extent. If they could have any reliable information of the falling off of production from abroad it would cheer them almost beyond measure. He would now give way with reference to their own mines. The resolution was carried unanimously, and

Capt. TEAGUE, in acknowledging the compliment, said he wished he could speak more hopefully and cheerfully than he was able to do. But the patent fact was before them that during the quarter they had sold nearly 500 tons of tin from the two mines, and if they had only had a 10% rise that would have made a difference to them of something like 5000*l.* to be divided amongst the adventurers.

on something that was to be divided among the shareholders, and the price of mining and the value of the tin would have remained precisely the same as under present conditions. Therefore, as he had already stated, any advance in the price of tin must be a direct benefit to them. (Hear, hear.) With regard to their home production of tin, there certainly was a considerable falling off when compared with three or four years ago. It had been diminishing every year until at the present time he did not think they were raising more than 100 tons a month, whereas formerly he had known it to be 1,000 tons. Thus, the tin market was still depressed, and the tin price had a material effect upon the existing state of things. The report which they received from time to time with reference to foreign tin seemed to be the reverse of reliable, because while they were told that the returns were falling off they had a practical contradiction of this in the fact that the tin still continued to arrive. At the same time he had received information which he believed to be thoroughly reliable, that the tin market was still depressed, and he had heard that about a month ago he had a letter relating to the state of affairs at Mount Bischoff, where it was said a world of tin existed. The writer of that letter spoke very hopefully of the nature of English tin mines, and told him that although they had an enormous quantity of tin at Mount Bischoff, yet there was not a single company that had divided a farthing since it had been there, and that so far from increasing their returns there was every probability of a considerable falling off. And yet this was the state of affairs at Mount Bischoff, where he had heard that a world of tin existed. His informant further told him what was of still greater importance—that up to the time of his writing no lode had been found worthy of the name, and he (Capt. Teague) therefore thought it was not unreasonable to assume that the alluvial deposits would soon work out. At the same time they must not ignore the fact that if the returns fell off in that particular part there might be improvements elsewhere, and that the same might be the case in the case of tin in Australia would cease, but he was firmly of opinion that the quantity in the future would not be anything like what it had been in the past. Another encouraging fact was that the consumption of tin went on, if not increasingly, yet keeping pace with all that was raised, both at home and abroad; and he thought, taking everything into account, that there was fair reason to hope that ere long they would witness a better state of things. He really believed—because he would not be a prophet—that the tin market would be a good deal better than it was at present, and that tin would not be behind hand in participating in the revival. It was a matter of great regret that they were obliged to raise such large quantities of stuff, and to get so little out of it. When they first commenced at Carn Brea the price of tin was 8/6 per ton, and it was a difficulty at that time to raise 115 tons a quarter. They had now more than doubled that quantity, and the same price per ton would have given them the same value of 105 tons. That was, at present, so far as the tin market was concerned, a serious matter for them. They must, however, go on and think, patiently, for the better times which he believed to be approaching.

Capt. LEAGUE, jun., remarked that great as was the depression to which they so long had to submit, they were not so stiff, and he really believed that they would survive successfully with the foreign market. If Australia supplied tin at 20s., a ton we must do the same, and he did not see any reason for despair. Cornishmen had gained a reputation as miners, and it would ill become them to do anything to forfeit that reputation. If Australia continued to supply tin to this country, we at home must do it cheaper.—*Western Daily Mercury.*

NEW CONSOLS SILVER AND ARSENIC WORKS.—An extraordinary general meeting of shareholders was held at the offices of the company, Queen Victoria-street, on May 23. Sir James Anderson in the chair. The meeting was called simply to pass resolutions to wind up the company voluntarily, and for the purpose of appointing Mr. Watson Smith (the late secretary) and Mr. James Pearce, of Tavistock (Chairman of the committee of creditors), joint liquidators.

SOUTH CARN BREA.—At the meeting, on Tuesday (Mr. Walter Pike, the purser, in the chair), it was resolved—"That the present operations be suspended, that the machinery and materials be offered to the lord at a valuation in accordance with the terms of the lease, and in the event of their being declined, that they be sold by auction, or by private contract." It appearing from the report of

the agents that the great flat lode in the western part of the mine presents encouraging features, and that explorations can be made at a trifling cost, it was resolved that the agents be instructed to continue to open on that lode for the next three months. There are 4300 good shares in the mine—20 only having been relinquished since the last meeting, when the 5s. call was made.

[For remainder of Meetings see to-day's Journal.]

STONE-BREAKING MACHINES.

The monthly meeting of members of the Mining Institute of Cornwall was held on Tuesday, at Camborne, Capt. W. TEAGUE, jun., presiding, when Mr. A. J. Campbell, A.R.S.M., read a paper on "The Use of Stone-Breaking Machines in Cornish Mines."

Mr. CAMPBELL in his paper said that stone-breaking machines were in use in many of the principal lead and copper mines in this country and abroad, and had invariably proved a source of great economy, but up to the present time they had not been used, except in a few isolated cases, for the breaking up of tinstuff, although where large quantities of ore had to be dealt with, and where the ore was so tough and hard, as was the case in many instances in Cornwall, they would prove a very valuable addition to the dressing appliances. One of the great sources of expense in tin dressing was undoubtedly hand labour, and while there were numerous and great difficulties in making the process more automatic than at present, still, the elimination of this hand labour where practicable, and the substitution of machine labour, was the object to be aimed at. The first process through which the tinstuff passed on its arrival at the surface—that of breaking it down to a suitable size for the stamps—required a large amount of hand labour, and was a serious addition to the dressing cost. This labour could be performed by a machine, not only at a less cost per ton, but with such increased efficiency that even if the cost was the same as far as the actual breaking was concerned, the machine would still be a source of great economy when compared with hand labour. By the use of a stone-breaker spalling was entirely done away with, and also the ragging to a large extent. The cost of the stone-breaker was one of the objections urged against its use, but he hoped to show that this was no objection, and that in spite of the high price of the machines great economy was gained by their use. They would be used most advantageously when considerable quantities of stuff had to be turned over, and where the rock was hard. Blake's machine was vastly superior to any other yet in use. (Of this machine the lecturer gave a very minute description, and of the principle upon which it was worked.)

The quantity of stone which could be broken in a given time must necessarily depend upon its degree of hardness as well as upon its structure, but the result might be augmented or decreased according to the distance—which could be regulated—between the jaws or the machine, and the speed given to the eccentric shaft. The best speed was from 200 to 250 revolutions per minute. Mr. Marsden had recently brought out new patent reversible cubing jaws, for which the advantages claimed were that the jaw would last very much longer, and that the reduced material was well and evenly broken to a regular gauge. The arrangement of these reversible jaws was very simple, and as they were made in sections Mr. Marsden urged that the expense of renewing them was considerably lessened. A stone-breaker would undoubtedly break a ton of stuff cheaper than it could be broken by hand labour, allowing for depreciation of machinery, and interest at 5 per cent. on the prime cost of the machine, and at a cost so much less than if about to lay out new floors for a mine where large quantities of stuff would in all probability be turned over, one would not hesitate to erect one or more of these machines, according to circumstances. But in considering the application of stone-breakers to Cornish mines they had to look at the case from a different point of view, for in the majority of cases the floor, as at present arranged, would need some alteration to obtain suitable levels for the advantageous working of a stone breaker. In some mines the alterations would have to be considerable, while others might very easily adapt their existing arrangements to suit a machine. Merely to place a stone-breaker or a mine without paying regard to the necessity of having suitable levels, so that the rocks had to be lifted up to the breaker, and the crushed rock again to be lifted up in order to be conveyed to the stamps; in fact, so to place a breaker that a very large amount of manual labour was required for the different processes of feeding, &c., was to render the stone-breaker almost useless as a source of economy. Capt. Tregay, of Pedu-an-dren Mine, had kindly furnished him with statistics, which showed that the saving in the cost of breaking by machine labour, as compared with hand labour, was at least 2½d. per ton, and he need scarcely remind them that the larger the returns were the greater would be the advantages in favour of the machine.

In the case of Pedn-an-drea, where the cost of hand spalling was calculated rather below the average of many mines, and a very large charge was assumed for the alteration of the floors, there was yet a balance of more than 2d. per ton in favour of the machine. It was easy to believe that under different circumstances this saving might amount to 4d., and even more per ton. But this was not all the economy gained by the use of a stone-breaker by any means, for in addition to this actual saving per ton in breaking there was another source of economy, due to the fact that the tinstuff left the machine so efficiently broken as to effect a diminution of stamping power equal to at least 25 per cent., because the rock was so crushed and its texture so destroyed that the stamps could act upon it with far greater effect. Thus the breaker did also part of the work of the stamps. Again, economy was indirectly effected by the fact that the machine did the work with far greater regularity and certainty than could possibly be attained by hand labour, while so long as there was stuff to supply the machine there would be no difficulty in keeping the stamps passes fully supplied. Hand labour averaged from 6d. to 7d. per cent., but it practically cost more, as the work was very often inefficiently done, and the stamps were consequently prevented from doing their full amount of work. The question of the position of the stone-breaker on a mine was of the highest importance. The great object must be to make the process as automatic as possible. No definite rule could possibly be laid down as to the position of the machine. That must depend to a great extent on local conditions, but the breaker ought to be so placed, as at Pedn-an-drea, that the stuff could be shovelled at once into the crushing-hopper. Thus all lifting up of the stuff to the breaker was avoided, and a large amount of hand labour saved. (Applause.)

The CHAIRMAN said he regarded the paper as a valuable contribution to the work of the Institute, and he thought many of his remarks were thoroughly practicable, and worthy of the consideration of the members.

Mr. Cox said it seemed to him that in the present condition of Cornish mining it was absolutely necessary that they should look forward to every mechanical means possible to save cost in the dressing of ores of all kinds, and he had no doubt that a very considerable saving could be effected in spalling and preparing ore for the stamps by the use of the stone-breaker. His experience of these machines was very limited, but he had seen a small one at work at Perranuthnoe, Marazion, and there two small boys earning about 10d. a-day did the work of eight girls earning from 1s. to 15d. a-day, so that the saving was a very material one. If the machine had been driven by steam or water power it would have done the work of at least 20 girls.

Capt. VINCENT remarked that he had been in the habit of using the stone-breaking machines in a mine with which he was connected in the North Wales district, and he endorsed a great deal of what had fallen from Mr. Campbell. But he thought the great and important feature of the stone-breaker in its comparison with hand labour was the position in which it was placed. In the mine to which he had referred they had been able with two men and a boy to put 100 tons a-day through the machine. The stuff was carried direct to the breaker, so that lifting was altogether avoided. Underneath the breaker there was an arrangement which carried the stuff right into the stamps passes. He did not think this question of position had been sufficiently well studied, and he trusted that greater attention would be paid to it in the future.

Mr. BOLDEN very much feared that the cost of the stone-breaking machines was the greatest objection to them, and he saw no reason

COLEBROOK'S PATENT STEAM PUMPS,
FOR HIGH OR LOW LIFTS AND GENERAL PURPOSES.

SOLE MAKERS,—

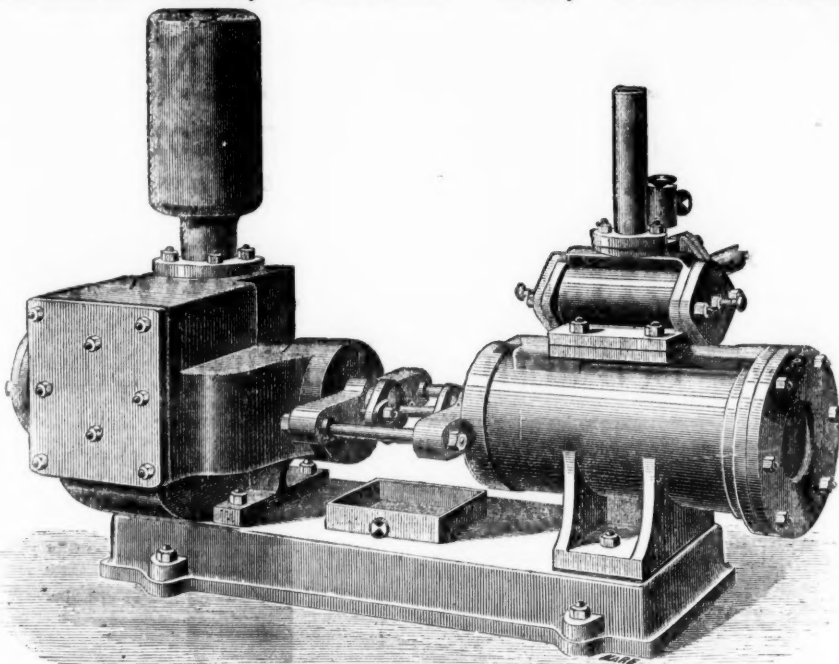
MAY AND MOUNTAIN,
BERKLEY ST., BROAD ST., BIRMINGHAM.

The accompanying Engraving represents a Steam Pump, suitable for general purposes; it possesses the following advantages over any other Steam Pump yet before the public:—

1st.—No tappets, eccentrics, levers, or other mechanical appliances are used to actuate the steam slide valve, but this office is performed by the exhaust steam.

2nd.—The only working parts in the steam cylinder are the piston and slide valve, and as there are no working parts in either the piston or cylinder covers, the full length of stroke is obtained.

3rd.—The slide valve is so easy of access that it can be examined, cleaned, and replaced in a few minutes, and it is impossible to make any error in replacing it



after examination, because it is immaterial which way it is inserted in the valve-box, whether one way or the other upwards, or whether end for end.

The Pump Valves are Colebrook's Patent, and are made in one piece. They are either of canvas, leather, india rubber, or other material, to suit the nature of the liquid to be pumped, and can be replaced in a very short time by any ordinary workman.

These Pumps are suitable for hot or cold water, hot or cold wort, sewage, ammoniacal liquor, tar, &c., and are adapted for use in breweries, chemical works, collieries, paper mills, dye-works, brick-yards, and for almost any other purpose.

SIZES AND PRICES OF COLEBROOK'S PATENT STEAM PUMPS.

Diameter of Steam Cylinder.....Inches	1½	3	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	7	8
Diameter of Pump Cylinder.....Inches	1	1½	2	2½	3	2	2½	3	4	3	4	5	3	4	5	6	3	4	5	6	4
Length of Stroke.....Inches	6	12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Price.....	£12	£16	£17	£18	£19	£19	£20	£22	£25	£23	£28	£32	£26	£33	£36	£41	£30	£38	£41	£45	£52
Diameter of Steam Cylinder.....Inches	8	8	8	8	9	9	9	9	9	10	10	10	10	10	10	12	12	12	12	12	...
Diameter of Pump Cylinder.....Inches	5	6	7	8	5	6	7	8	9	5	6	7	8	9	10	6	7	8	9	10	...
Length of Stroke.....Inches	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	...
Price.....	£45	£50	£56	£65	£50	£55	£60	£70	£81	£62	£68	£70	£80	£95	£100	£80	£85	£90	£100	£115	£135

THE "CRANSTON" ROCK DRILL

SUITABLE FOR

QUARRYING, SINKING SHAFTS, SUBMARINE BLASTING, TUNNELLING, DRIVING ADITS, Is the MOST SIMPLE and ECONOMICAL DRILL now in use.

BOILERS; AIR COMPRESSORS, worked by Hydraulic or Steam-power; STEEL for MINING DRILLS; PUMPING, and all other MINING MACHINERY supplied.

For Prices, Estimates, and other Particulars, apply to—

J. G. CRANSTON, 22, GREY STREET, NEWCASTLE-ON-TYNE.

Mr. TAIT, Manager, East Hetton Quarry Company's Works, Coxhoe, Durham, writing on May 12, 1876, says—"I have pleasure in testifying to the value of your Rock Drills. The two you supplied us with about six months ago are giving us entire satisfaction. The cost of drilling by machine is less than ONE-FOURTH THAT OF DRILLING BY HAND. By the use of the Drills we have been able very greatly to increase the out-put of stone without increasing the number of men employed."

COAL-CUTTING MACHINERY.

W. and S. FIRTH undertake to CUT, economically, the hardest CANNEL, ANTHRACITE, SHALE, or ORDINARY COAL, ANY DEPTH, UP TO FIVE FEET.

Apply,—

16, YORK PLACE, LEEDS.

INCREASED VALUE OF WATER-POWER.

THE EXTRAORDINARY ADVANCE in the PRICE of COALS has DIRECTED more ATTENTION to WATER POWER, and to the BEST MANNER of APPLYING IT. For many years it has been, to a great extent, neglected and undervalued. One great objection to it has been the variable nature of most streams in these countries, having abundance of water during the winter half-year, and very little in the dry season. No kind of wheel hitherto known was able to give the proper proportion of power from the smaller quantities of water, so that it became the practice very generally to use steam entirely during the summer half of the year, letting the water go to waste. This is now completely prevented, and the full available power can be obtained from a stream at every season by using

Mac Adam's Variable Turbine.

This wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and, in this way, always assists it by whatever amount of power the water is capable of giving, and, therefore, saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to the makers—

MAC ADAM BROTHERS AND CO., ENGINEERS, BELFAST.

THE NEWCASTLE DAILY CHRONICLE (ESTABLISHED 1764.) THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER Office, Westgate-road, Newcastle-upon-Tyne; 50, Howard-street, North Shields; 195 High-street, Sunderland.

DETONATORS

FOR DYNAMITE, LITHOFRACTEUR, GUN COTTON, &c., OF THE BEST QUALITY AND STRONGEST POWER, DELIVERED FREE IN LONDON.

For prices, terms, and full particulars, address—

MESSRS. BRAUN AND BLOEM, 85, GRACECHURCH STREET, LONDON, E.C.

BICKFORD'S PATENT FOR CONVEYING CHARGE IN



SAFETY FUSE, FIRE TO THE BLASTING ROCKS, &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXHIBITION," held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXHIBITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Antwerp, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," at Vienna, in 1873; and at the "EXPOSITION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH AND CO., TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES OF SAFETY-FUSE, having been informed that the name of their firm has been attached to fuses not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL OF FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH THE COLUMN OF GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

RAILS FOR SALE.

Bridge Section, 10 to 25 lbs. per yard.
Flange Section, 16 to 70 lbs. per yard.
DH Section, 50, 60, to 70 lbs. per yard.
Steel Rails, 30, 36, 54, 58, to 66 lbs. per yard.

NEW PERFECT, NEW DEFECTIVE, AND SECONDHAND IN STOCK.

PERMANENT WAY RAILS, of all sections, made to order.

For sections and price, apply to—

ROBERT WRIGHTSON, NEWPORT, MON.

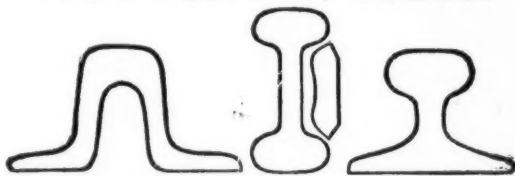
SHUNTING.

OVER 3000 OF THE RAILWAY TRUCK AND CARRIAGE SHUNTER now in use. (HESHUYSEN'S PATENT.)

For particulars and Illustrated Price List apply to—

F. G. AND W. FRANCIS, RAILWAY SHUNTER FACTORY, FOLKESTONE.

JOHN BEATSON, DERBY.



IRON AND STEEL RAILS, of all sections, from 10 to 82 lbs. per yard, new, defective, or second-hand.

POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAIRS, AND SPIKES. LOCOMOTIVE ENGINES AND MACHINERY. MALLEABLE AND PIG-IRON OF ALL KINDS.

Delivered at all Ports and Railway Stations in Great Britain. A SECONDHAND SIX-WHEELED TANK LOCOMOTIVE FOR SALE.

THE TAVISTOCK IRONWORKS, ENGINEWORKS, FOUNDRY, AND HAMMER MILLS, TAVISTOCK, DEVON.

NICHOLLS MATHEWS, AND CO. ENGINEERS, BRASS AND IRON FOUNDERS, BOILER MAKERS AND SMITHS.

MACHINERY OF CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.

Also of SPUR, MORTICE, MITRE, BEVEL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means. MACHINERY or FOREIGN MINES carefully prepared. SECONDHAND MINING MACHINERY, in good condition, always on sale, at moderate prices.

CAPTAIN ABSALOM FRANCIS MINING AGENT, ENGINEER, AND SURVEYOR GOGINAH, ABERYSTWITHE.



PARIS INTERNATIONAL EXHIBITION, 1867.



VIENNA INTERNATIONAL EXHIBITION, 1873.



LONDON INTERNATIONAL EXHIBITION, 1874.



CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

TANGYE BROTHERS AND HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.,
AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

The "SPECIAL" DIRECT-ACTING STEAM PUMP, WITH Holman's Patent Self-acting Exhaust Steam Condensers.

UPWARDS OF 12,000 "SPECIAL" STEAM PUMPS ARE IN USE.

After eight years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once the simplest and most certain in action. There is absolutely no extraneous gear, and the steam cylinder is no longer than the pump. The valves are of easy access, and are suited for pumping fluids and semi-fluids of almost any consistency.

Holman's Condenser

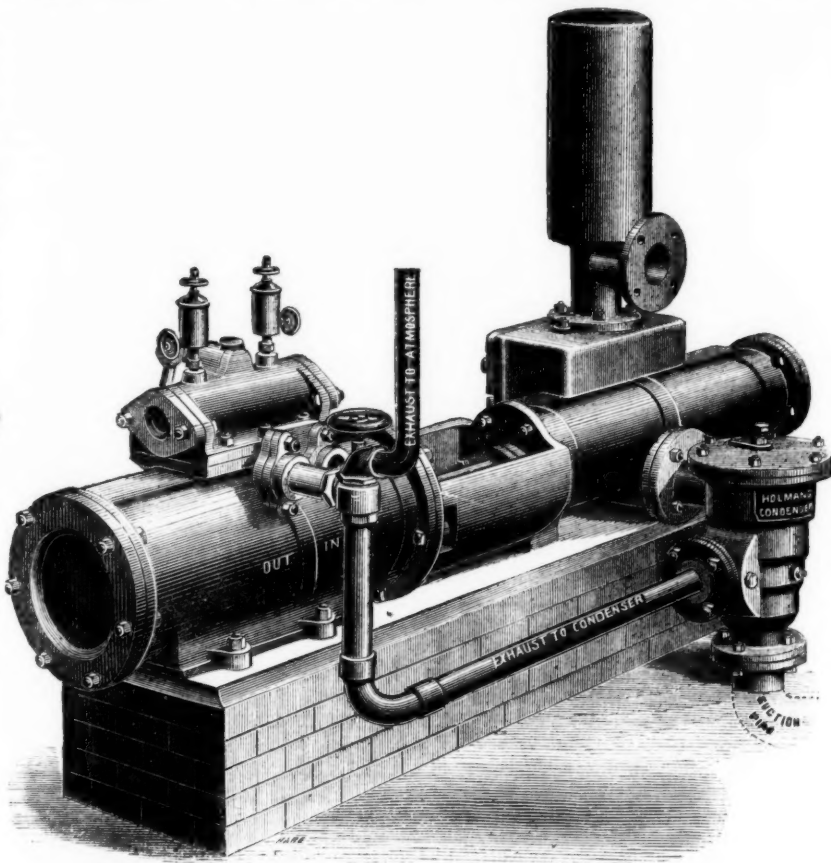
Turns waste steam into
GREAT POWER.

SAVES HALF ITS COST IN PIPES AND CONNECTIONS.

PREVENTS ALL ESCAPE OF STEAM IN MINES OR ELSEWHERE.

REQUIRES NO EXTRA SPACE.

SAVES TWENTY TO FIFTY PER CENT. OF FUEL.



WILLIAM ELLIOT, Esq., of the Weardale Iron and Coal Company, writes under date Sept. 17th, 1875, as follows:—"We have now THIRTY-FIVE of your SPECIAL STEAM PUMPS in operation at the various collieries under my charge—some of them employed pumping water out of our pits to the depth of 50 fms.—others employed in the pits, and a good many feeding Boilers. I have no hesitation in saying that we have found them the Cheapest and Best Pumps of the kind we have tried. I can with confidence recommend them to intending purchasers."

Messrs. BURT, BOULTON, and HAYWOOD, Chemical Manufacturers, of London, have FORTY of the "SPECIAL" STEAM PUMPS in use at their works.

HOLMAN'S CONDENSERS

Are made to suit any size and kind of Steam Pump. They form a part of the suction pipe of the Pump, and while they effectually condense the exhaust steam they produce an average vacuum of 10 lbs. per square inch on the steam piston, increasing the duty of the Engine, and effecting a saving in fuel of from 20 to 50 per cent.

In Mining operations these Condensers will be of great value.

All Boiler Feeders are recommended to be fitted with these Condensers, as not only is the exhaust steam utilised in heating the feed water, but is returned with it into the boiler.

GREAT REDUCTION IN PRICES.

The following sizes are suitable for low and medium lifts:—

Diameter of Steam Cylinder ...In.	3	4	4	4	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10
Diameter of Water Cylinder ...In.	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5	6	7	8	5	6	7	8	9	5	6
Length of Stroke .....In.	9	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	18	24	12	12
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	9750	13,000	16,500	5070	7330
Price of Special Pump ...£	16	18	20	25	22	10	27	10	32	10	25	30	35	40	30	35	40	45	50	40	45	50	55	65	50	55	60	70
Extra, if fitted with Holman's Condenser and Blow-through Valve	£7	£7	£9	£11	£8	10	£11	10s	£12	10s	£9	£12	£15	£15	£10	£13	£15	£16	£22	£13	£16	£16	£22	£22	£16	£16	£23	£24

CONTINUED.

Diameter of Steam Cylinder..In.	10	10	10	10	12	12	12	12	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	18
Diameter of Water Cylinder..In	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14
Length of Stroke .....In.	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Gallons per hour	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000
Price of Special Pump..£	65	75	90	100	75	80	85	110	120	140	110	120	130	140	160	180	140	150	160	180	200	180	190	210	230
Extra, if fitted with Holman's Condenser and Blow-through Valve	£23	£24	£35	£35	£20	£27	£27	£38	£38	£50	£28	£28	£40	£40	£55	£55	£28	£40	£40	£55	£55	£45	£45	£56	£60

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

The "Special" Steam Pump can be worked by Compressed Air as well as by Steam.

HUNDREDS of these PUMPS are USED for HIGH LIFTS IN MINES, for which purpose they are made with 21, 24, 26, 28, 30, and 32-inch Steam Cylinders, and 36 48 and 72-inch Strokes.

The following Testimonial gives one Example of the Power Gained by the action of Holman's Patent Condensers:—

NORLEY COLLIERY, WIGAN.

Messrs. TANGYE BROTHERS AND HOLMAN.

GENTLEMEN,—I have great pleasure in recording my entire satisfaction with the working of the Holman's Patent Steam Pump Condenser which you have supplied to us. The complete condensation of the steam is, apart from its value in the strict economical sense, a most valuable feature in the drainage of underground work.

ings. The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10½ lbs. per square inch, even when we run the Pump upwards of 80 strokes (168 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 84 strokes (168 feet) per minute, the steam gauge

indicating a steam pressure of 26 lbs. per square inch, 80 yards from the Pump and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches, I turned the exhaust steam from the Condenser into the mine sphere, when the speed at once fell to 44 strokes per minute. The working economy thus shown is really so great that the cost of the Condenser must be saved in a very short time. (Signed) J. THOMPSON.

NORTH OF ENGLAND HOUSE
SOUTH WALES HOUSE...

TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
TANGYE BROTHERS AND STEEL, Tradeagar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

BLAKE'S PATENT STEAM PUMP.

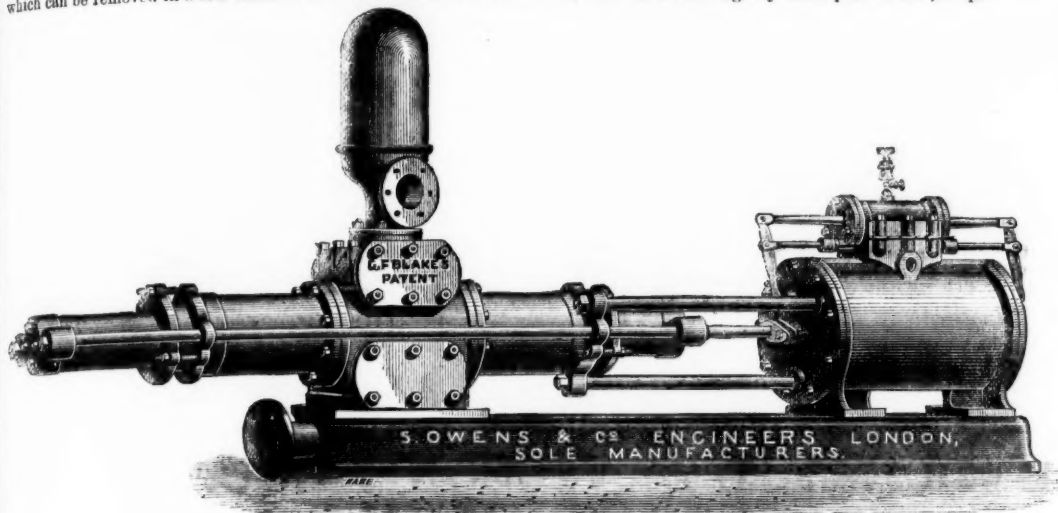
MORE THAN 10,000 IN USE.

SOLE MAKERS FOR GREAT BRITAIN.

S. OWENS & CO.,

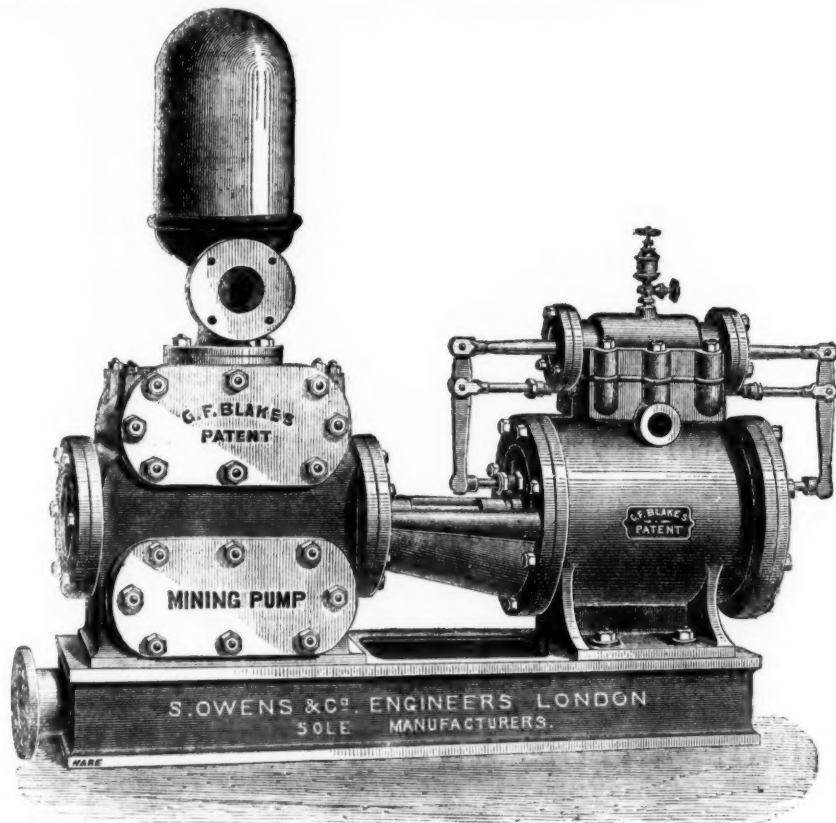
Hydraulic and General Engineers, Whitefriars-street, London;
Agent in Scotland: W. Hume, 195, Buchanan-street, Glasgow.

These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.
S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:-

Dia. of steam cylinders, In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	18	20	20	20	20	24	24
Dia. of water cylinders, In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	8	9	6	8
Length of stroke, In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	30	36	36	42	42
No. of strokes per minute.	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	20	17	17	15	15
Quantity in gallons per hour, approximately	1440	2610	4200	5940	2940	4620	6600	2646	4158	5940	10620	2646	5160	7500	13260	4586	9000	12360	15360	6720	12000

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION

PATENT CONDENSERS

Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

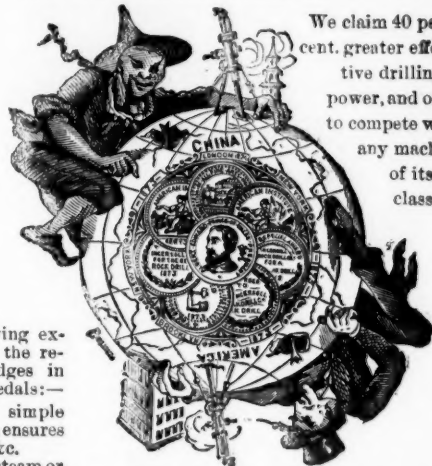
The Blake Pump will work under water, and as efficiently with compressed air as with steam.

BLAKE'S DONKEY PUMPS FOR FEEDING BOILERS KEPT IN STOCK.

PATENT

"INGERSOLL ROCK DRILL," LE GROS, MAYNE, LEAVER, & CO.

60, Queen Victoria Street, London, E.C.
5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per cent. greater effective drilling power, and offer to compete with any machine of its class.

See following extracts from the reports of Judges in awarding Medals:-

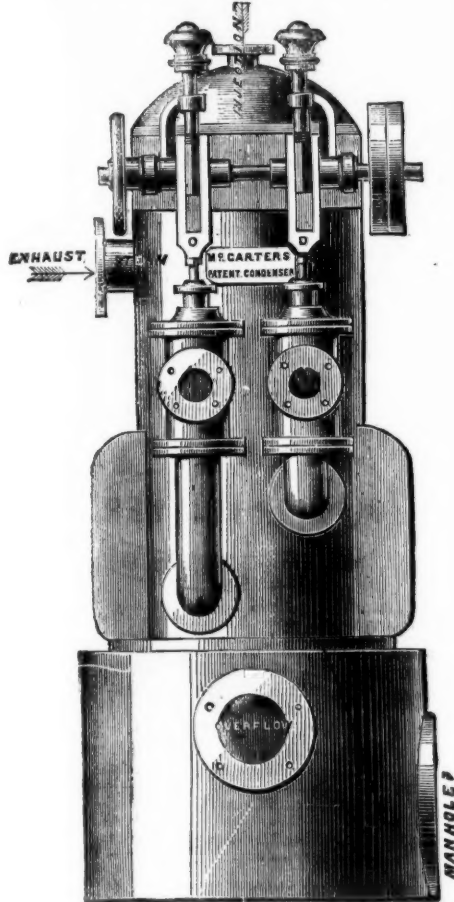
- "2. Its simple construction ensures durability, &c.
- "4.—The steam or air cushions at each end of cylinder effectually protect from injury.
- "5. Its having an automatic feed, giving it a steady motion, &c.
- "6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.
- "7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

Medals awarded for several years in succession "For the reason that we adjudge it so important in its use and complete in its construction as to supplant every article previously used for accomplishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining Machinery. Send for Illustrated Catalogues, Price Lists, Testimonials, &c., as above.

LICENSED MAKERS.

KIRK, RAMSDEN, AND CO.
(LIMITED)
HUDDERSFIELD.



These Condensers can be placed inside or outside of the engine-house. They draw their own injection water, and require no foundation. Specially adapted to Pumping and Winding Engines, effecting a saving from 20 to 30 per cent. in coal, and increases the power of the Engine.

Engineers, Millwrights, Founders,
AND
FORGE PROPRIETORS.

Makers of Pumping, Winding, and Blowing Engines, Condensing and Non-condensing.

Horizontal and Beam Engines for all purposes.

LA HOUILLE (Weekly Journal) represents the IRON and COAL TRADES of FRANCE. Advertisements referring thereto, and subscriptions, 20s. per annum, post paid, received by the London Agents, EDWARD CASPER and Co., 40, Finsbury Circus, E.C.

Just published, Free Edition.

GUIDE TO HEALTH; OR, ADVICE AND INSTRUCTIONS FOR THE CURE OF NERVOUS DEBILITY.—A New Medical Work on the treatment of Local Debility, Consumption, Loss of Memory, Physical Depression, Indigestion, and all diseases resulting from loss of nerve power. Illustrated with cases and testimonials. Sent free for two stamps.—Dr. SMITH will, for the benefit of country patients, on receiving a description of their case, send a confidential letter of advice.
Address, Dr. H. SMITH, 8, Burton-crescent London, W.C.

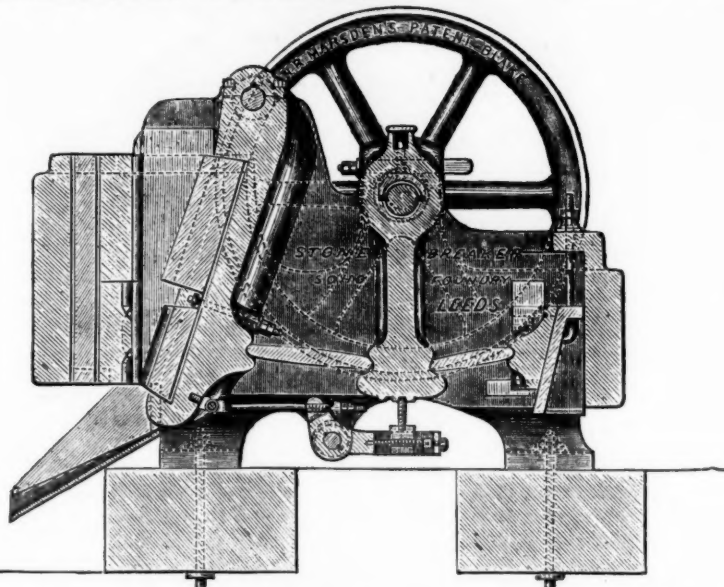
BLAKE'S NEW PATENT STONE BREAKER.

H. R. MARSDEN,
ORIGINAL PATENTEE, AND ONLY MAKER IN THE UNITED KINGDOM.—2000 IN USE.

These Machines are in extensive use amongst the Tin, Copper, Lead, and other Mines, and are showing a clear saving of 4d. and 6d. per ton over the ordinary mode of hand spalling, besides a diminution of stamping power equal to 30 per cent., which is a considerable saving. They are already well known to the mining world, and can be seen in operation at some of the leading Cornish and other Mines. For breaking the elvan rock they have established a decided supremacy over other Machinery.

Exclusively adopted by Her Majesty's Government, and by most Continental Governments.

Machines for Hand and Steam Power, specially designed and largely used for Crushing Pyrites, Limestone, Cement, Coal, Rocks, Ganister, &c., at all the principal works in the Kingdom.



Used by all the Great Mining Companies in the World, and are shown by Testimonials to effect a Saving of FIFTY per cent. over every other system.

Awarded 62 Gold and Silver Medals:—

Paris, 1867.
Santiago, 1869.
Leeds, 1875.
Leicester, 1868.
Cardiff, 1872.
Bolton, 1872.
Ayr, 1873-4-5-6, &c.

EXTRACTS FROM TESTIMONIALS.
"They occupy an important position as labour-saving Machines."
"The Machine is well designed, simple, but substantially made, and is capable of reducing any material to fine gravel, such as copper ore, and is certainly preferable to the stamps in use for that purpose."
"Your Machine will crush from 60 to 120 tons of hard limestone per day of 10 hours."

This illustration shows my new patent REVERSIBLE Cubing Jaws, which are made in upper and lower sections, and the backs planed, so that when the bottom part of the lower section becomes worn it can be turned upside down, and thus made equal to new. This process does not require the aid of skilled labour, the white metal being entirely dispensed with.
THESE JAWS WILL WEAR FOUR TIMES longer than any other, and they can be renewed at a fractional cost.

"No Machine is equal to yours, combining as it does very great power, simplicity of construction, and cheapness."
"Mr. Marsden's Stone Breakers are so thoroughly well known and appreciated that it is unnecessary for us to describe their construction or speak of their merits."
"By the use of your Machine we have reduced the cost of breaking and forming road material to one-half its previous cost."
"Our 15 by 7 Machine has broken 4 tons of hard whinstone in 20 minutes for fine road metal, free from dust."

CATALOGUES, TESTIMONIALS, &c. (in the French or German language, if required), on application to the sole maker of "Blake's" Stone Breaker:—
H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

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